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No.

In the Supreme Court of the United States

OCTOBER TERM, 1970

FEDERAL POWER COMMISSION, PETITIONER

v.

FLORIDA POWER & LIGHT COMPANY

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

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The Solicitor General, on behalf of the Federal Power Commission, petitions for a writ of certiorari to review the judgment of the United States Court of Appeals for the Fifth Circuit in this case.

OPINIONS BELOW

The opinion of the Court of Appeals (App. A, *infra,* pp. 13–33) is not yet reported. The opinions and orders of the Federal Power Commission (App. C, *infra,* pp. 37–62) are reported at 37 FPC 544 and 37 FPC 833. The opinion of the hearing examiner (App. D, *infra,* pp. 63–91) is reported at 37 FPC 560.

JURISDICTION

The judgment of the court of appeals (App. B, *infra,* p. 35) was entered on July 13, 1970. By order dated October 5, 1970, Mr. Justice Black extended the

time within which to file a petition for a writ of certiorari to November 10, 1970. The jurisdiction of this Court is invoked under 28 U.S.C. 1254(1) and Section 313(b) of the Federal Power Act (16 U.S.C. 825*l*(b)).

QUESTION PRESENTED

Whether the Federal Power Commission properly determined that the interconnection of an electric power utility with an interstate transmission grid involved "transmission of electric energy in interstate commerce" and thus made the utility subject to the Commission's regulatory jurisdiction.

STATUTE INVOLVED

Section 201 of the Federal Power Act, as added, 49 Stat. 847 (16 U.S.C. 824), provides in pertinent part:

SEC. 201

* * * * *

(b) The provisions of this Part shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but shall not apply to any other sale of electric energy or deprive a State or State commission of its lawful authority now exercised over the exportation of hydroelectric energy which is transmitted across a State line. The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, except as specifically provided in this Part and the Part next following, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the trans-

mission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.

(c) For the purpose of this Part, electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof; but only insofar as such transmission takes place within the United States.

* * * * *

(e) The term "public utility" when used in this Part or in the Part next following means any person who owns or operates facilities subject to the jurisdiction of the Commission under this Part.

STATEMENT

This case involves the Federal Power Commission's determination that the Florida Power & Light Company ("FPL") owns facilities for the transmission of electric energy in interstate commerce and thus is subject to the Commission's jurisdiction under Section 201 of the Federal Power Act, 16 U.S.C. 824. Although the only immediate impact of the determination would be to require FPL to follow the Commission's Uniform System of Accounts, the establishment of jurisdiction would empower the Commission, under appropriate circumstances, to direct FPL to interconnect with and sell power to other utilities or distributors, thereby improving the reliability of service to consumers, and would enable the Commission to regulate FPL's future sales of interstate

power at wholesale. The court of appeals reversed the order of the Commission, rejecting the methods adopted by the Commission for determining whether FPL transmits electricity in interstate commerce.

1. The facts developed before the Commission, in a proceeding initiated in 1965, can be summarized as follows: FPL is the largest electric utility in Florida and ranks ninth nationally in terms of revenues (App. C, *infra,* p. 39). Its extensive transmission, generation and distribution facilities, which provide power generally to the east coast of Florida, are all physically located within Florida and none of the facilities are used for the direct transmission of electricity across the state line. FPL is directly interconnected, however, with the Florida Power Corporation ("Corp") and three other Florida utilities which, together with FPL, form the Florida Pool; substantial amounts of electricity are exchanged among Pool members (App. C, *infra,* pp. 40-41). Corp, in turn, is directly interconnected across the state line with two subsidiaries of the Southern Company (a holding company of four major utilities operating in the South)—including the Georgia Power Company ("Georgia"). By contract, substantial amounts of electricity are exchanged on a seasonal basis between Corp and the subsidiaries of the Southern Company (App. C, *infra,* p. 41).

All of the power companies named above, including FPL, are among the 140 interconnected utilities making up the Interconnected Systems Group (hereinafter "ISG") spanning the southeastern and cen-

tral portions of the United States (App. C, *infra,* p. 42). FPL operates in synchronism with the other members of ISG and stands ready to assist them or to receive assistance in the event of emergency (App. D, *infra,* p. 69). The record discloses at least one instance during which FPL contributed power to help meet an emergency created by the loss of a mid-western generator (App. D, *infra,* p. 69).

In short, the record shows that FPL is a part of an interconnected, multi-state electric system; its operations in many respects are interdependent with the operations of the other members of ISG. To estabish jurisdiction over FPL, Section 201 of the Federal Power Act required the Commission to find that FPL had transmitted electric energy across the state line or had received energy from outside of Florida. 16 U.S.C. 824 (b) and (c). The evidence submitted to the Commission by its staff and FPL concentrated on whether there was a flow of energy between FPL and Georgia over the transmission lines of Corp.

In an effort to show that transmission had indeed taken place between FPL and Georgia, the staff presented extensive expert testimony on the physical characteristics of alternating current and its transmission tending to show that all elements of an electric network are physically interdependent, *i.e.,* that there is an "electromagnetic unity"; thus, for example, the addition of a load to one part of a network will instantaneously affect every generating unit in the system, all of which are synchronized (App. D, *infra,* p. 72). The staff alternatively utilized a

method of tracing power flows known as the "commingled method" for the purpose of showing that Georgia power reached FPL's lines (App. D, *infra,* p. 80). FPL, on its part, argued in favor of the "systems study" tracing method, which it claimed demonstrated that no power flowed between FPL and Georgia.[1] Both tracing methods were applied to data obtained from the commercial meters installed in the Corp and FPL systems.

2. After a comprehensive analysis of the interdependence and synchronization of power utilities forming an interconnected system (App. D, *infra,* pp. 70–79), the hearing examiner found that it was "the electromagnetic unity of response of [FPL], Corp, Georgia and other interconnecting systems that constitutes the interstate transmission of electric energy by [FPL]" (App. D, *infra,* pp. 78–79). In the alternative, however, he went on to consider the two tracing methods urged by the staff and FPL, noting at the outset that the nature of electric energy is not fully understood and that there is no physical way to trace the flow of electricity as one might trace the flow of a liquid through dyeing (App. D, *infra,* p. 79). He characterized the tracing methods advocated by the staff and FPL as attempts to "transpose the complex dynamism of modern alternating current electric sys-

[1] The two tracing methods are based on different assumptions as to what takes place within a "bus bar"—the physical device used to effect interconnections among two or more transmission lines. For a concise explanation of the bus bar and the assumptions underlying the two tracing theories, see the opinion of the hearing examiner, App. D, *infra,* pp. 80–82.

tems into simplified models on the basis of numerous assumptions" (App. D, *infra,* p. 80). With these limitations in mind, the examiner ruled that, if any tracing were necessary, the staff's commingled method best fit the realities of an alternating current power system. Accordingly, he found that the staff had established by tracing that power had been transmitted between FPL and Georgia (App. D, *infra,* pp. 82–83).

The Commission, in a 3–2 decision, accepted both of the alternative findings of the examiner, noting that the commingled tracing method had been used by it, with court approval, in numerous cases to establish that wholesale sales of power were in interstate commerce (App. C, *infra,* p. 46).

3. On review, the court of appeals reversed the Commission's order. It held that the electromagnetic unity theory was insufficient, standing alone, to prove that power flowing from Corp to Georgia, whether scheduled or non-scheduled, contained power generated by FPL or that power flowing from Corp to FPL contained power generated outside of Florida (App. A, *infra,* p. 23). As to the commingled tracing method, the court reiterated that the flow of electric energy was "not yet fully explainable" (App. A, *infra,* p. 24) and held that the "engineering and scientific fact test for interstate flow of energy is not met by postulating a simplified characterization of how, for various purposes of convenience, energy may be treated as flowing" (App. A, *infra,* pp. 26–27). It distinguished the prior court of appeals cases approving the commingled method for determining Commission

jurisdiction over sales at wholesale (see *infra,* pp. 9–10) on the ground that in each of those cases the utility had concededly received interstate power and the tracing method was only used to determine whether such power reached specific customers; it found this case distinguishable because it involved use of the method to trace interstate power to FPL itself, which denied receiving it (App. A, *infra,* p. 27–30).

REASONS FOR GRANTING THE WRIT

The issue presented by this case is of fundamental importance to the administration of the Federal Power Act. The decision below, which conflicts in principle with the decisions of three other courts of appeals, improperly rejected the Commission's alternative grounds for asserting jurisdiction over FPL, both of which were fully supported on the record by substantial evidence and expert testimony. By thus rejecting both the theory which fully takes into account the physics of modern interconnected electric systems (electromagnetic unity) and the tracing theory judged by the Commission to be the best approximation of the realities of electric power transmission, the decision leaves the Commission with no adequate basis for determining the scope of its own jurisdiction. Considerable uncertainty will undoubtedly prevail, with a likelihood of substantial further jurisdictional litigation, unless the issue is resolved by this Court. Such uncertainty would jeopardize the Commission's ability to regulate sales at wholesale of interstate power

and to order, under appropriate circumstances, interconnections between utilities.

1. The court below recognized (App. A, *infra*, p. 16) that whether electric energy moves "in interstate commerce" within the meaning of Section 201 of the Federal Power Act[2] is a question of "engineering and scientific" fact. See *Connecticut Light & Power Co.* v. *Federal Power Commission*, 324 U.S. 515, 529; *Federal Power Commission* v. *Southern California Edison Co.*, 376 U.S. 205, 209, n. 5. It rejected, however, the Commission's expert opinion that the electromagnetic unity theory best takes into account such facts. The court's rejection of this theory and of the commingled method of tracing power as an oversimplification is inconsistent with the positions taken by three other courts of appeals.[3] See *Public Service Co. of Indiana, Inc.* v. *Federal Power Commission*, 375 F. 2d 100 (C.A. 7), certiorari denied, 387 U.S. 931; *Cincinnati Gas & Electric Co.* v. *Federal Power Commis-*

[2] Section 201 was added to the Federal Power Act in 1935, 49 Stat. 847, to bring interstate sales of electricity under federal regulation following this Court's decision in *Public Utilities Commission v. Attleboro Steam & Electric Co.*, 273 U.S. 83, holding that such sales were beyond the reach of state regulatory authorities. The interstate transmission involved in *Attleboro* was a direct transmission between two utilities located in different states.

[3] Until the decision below created this conflict, acceptance of the commingled tracing method by the other courts of appeals indicated that the extensive jurisdictional litigation which had consumed much of the Commission's energies had come to an end and that therefore the Commission would be able to devote its full resources to the performance of its substantive obligations under the Federal Power Act.

sion, 376 F. 2d 506 (C.A. 6), certiorari denied, 389 U.S. 842; *Indiana & Michigan Electric Co.* v. *Federal Power Commission,* 365 F. 2d 180 (C.A. 7), certiorari denied, 385 U.S. 972; *Arkansas Power & Light Co.* v. *Federal Power Commission,* 368 F. 2d 376 (C.A. 8). Three of these cases approved the Commission's reliance upon the commingled method to trace power from an admittedly interstate interconnection to specific sales at wholesale. The distinguishing of those cases on the ground that a method which is a satisfactory representation of reality for some jurisdictional purposes is not satisfactory for other jurisdictional purposes is, we submit, untenable.

2. The decision below would leave the Commission with no acceptable means for determining the scope of its own jurisdiction.[4] The jurisdictional status of a utility, however, is a matter of considerable importance to all concerned (although the only immediate effect of the Commission's order in this case would be to require FPL to follow the Commission's Uniform System of Accounts thereby subjecting FPL's operations to Commission and public scrutiny on the same basis as the operations of other utilities). If a utility is subject to the Commission's jurisdiction, its wholesale rates for interstate power sales are subject to regulation by the Commission, and the utility may not grant undue preference to its whole-

[4] The decision below did not approve of FPL's "systems study" tracing method, which, as the Commission held (see, *infra,* p. 7), was inferior to the commingled tracing method in approximating the realities of electric energy transmission. FPL's method is, thus, a fortiori unacceptable on the principles of the opinion of the court of appeals.

sale customers as a class or discriminate between them individually. Of equal importance, in view of the public need for reliability in the supply of electricity, is the Commission's authority to order utilities subject to its jurisdiction, under certain circumstances and under appropriate terms, to interconnect with other utilities so as to improve reliability of service and result in economies for both parties to the interconnection. See *Florida Power Corporation* v. *Federal Power Commission,* 425 F. 2d 1196 (C.A. 5), certiorari granted, October 26, 1970, No. 469, this Term.

3. In substance, the court of appeals has held that the Federal Power Commission cannot regulate electric power utilities on the basis of their interstate interconnections unless it can prove with scientific certainty that electric energy physically moves across a state line. It has thus put on the Commission a burden that is impossible to meet in the present state of technical knowledge, and is content to say that unless and until technical knowledge advances to a state that permits certainty the Commission cannot assert jurisdiction. This is not a satisfactory posture in which to leave this important question. By definition, the Commission either does or does not have jurisdiction, and whether it does depends upon whether there is interstate transmission in the general sense in which that term was used in the context of interstate commerce. We acknowledge that the Commission has the burden of establishing the existence of the jurisdictional premise, but urge that it has done so when it has determined, on the basis of substantial evidence, that the premise exists in the light

of the best current expert opinion. As in other regulatory areas, decision cannot be avoided on the ground that no decision can have absolute certainty; indeed, it is the impossibility of such absolute certainty that necessitates resort to the expert judgment of an administrative agency.

Moreover, the decision below ignores the economic realities of an interconnection situation such as FPL's. What we are dealing with here is the meaning of the phrase "transmission of electric energy" which Congress has used in stating the scope of its exercise of the power to regulate "commerce" among the several states. Whether some identifiable *thing* moves or not, it is clear that this interstate interconnection has both physical and economic effects which transcend state lines. Those effects are within the concept of the "commerce" that Congress can regulate and within the proper construction of the standard established by Congress to define the area it wishes to regulate.

CONCLUSION

For the foregoing reasons, the petition for a writ of certiorari should be granted.

Respectfully submitted.

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GORDON GOOCH,
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Solicitor,
Federal Power Commission.

NOVEMBER 1970.

APPENDIX A

In the United States Court of Appeals for the Fifth Circuit

No. 24956

FLORIDA POWER & LIGHT COMPANY, PETITIONER

v.

FEDERAL POWER COMMISSION, RESPONDENT.

PETITION TO REVIEW AND SET ASIDE OPINION AND ORDERS OF THE FEDERAL POWER COMMISSION (FLORIDA CASE)

(July 13, 1970)

Before BELL, AINSWORTH and GODBOLD, *Circuit Judges.*

GODBOLD, *Circuit Judge:* Florida Power & Light Company (FPL) petitions for review of a determination,[1] reached by the Federal Power Commission on a 3–2 vote, that it is a public utility within the meaning of § 201 of the Federal Power Act, 16 U.S.C. § 824(e). We reverse the Commission and set aside its order.

The term "public utility" means "any person who owns or operates facilities subject to the jurisdiction of the Commission under sections 824–824h of this

[1] 37 F.P.C. 544.

title." 16 U.S.C. § 824(e). "The provisions of sections 824–824h of this title shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce * * * The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy." 16 U.S.C. § 824(b).

The Commission asserts jurisdiction on the ground that FPL owns and operates facilities for the transmission of electric energy in interstate commerce. Jurisdiction over interstate wholesale sales under § 824(b) is not involved.

1. BACKGROUND

FPL's facilities are located wholly within the State of Florida. It has no connections at the state line with any out of state system. Commission jurisdiction is predicated on transmission interstate of FPL-generated power through its interconnection with other electric systems outside of and within Florida, and receipt by FPL, through these interconnections, of power generated outside of Florida.

Congress exercised its power under the Commerce Clause and undertook federal regulation in the interstate electric field as a result of the decision of the Supreme Court in *Public Utilities Commission of Rhode Island v. Attleboro Steam & Electric Co.*, 273 U.S. 83, 71 L.Ed. 549 (1927), holding that neither Massachusetts nor Rhode Island had power to regulate the sale by a Rhode Island utility of electric energy to a Massachusetts utility because the sale was in interstate commerce. There being at that time no federal regulation of interstate sales by electric utilities, Congress acted to close this gap in effective

utility regulation, the "Attleboro gap," by enacting Part II of the Federal Power Act in 1935.

Jurisdiction of the FPC is not based upon a test of effect on interstate commerce but upon interstate transmission of electric energy (or wholesale sales in interstate commerce, not here applicable). 16 U.S.C. § 824(b). To make clear that Commission jurisdiction extends only to transmission or sales "in interstate commerce," the Congress wrote several specific exclusions into the Act.

> * * * such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States.

16 U.S.C. § 824(a). This caveat and the directive that the Act.

> shall not apply to any other sale of electric energy or deprive a State or State commission of its lawful authority now exercised over the exportation of hydro-electric energy which is transmitted across a State line * * *,

16 U.S.C. § 824(b), extend Commission jurisdiction to the limits of but no further than the Attleboro gap. *Connecticut Light & Power Co.* v. *FPC*, 324 U.S. 515 89 L.Ed. 1150 (1945); *Jersey Central Power & Light Co. v. FPC*, 319 U.S. 61, 87 L.Ed. 1258 (1943).

> Likewise, the Commission shall not have jurisdiction, except as specifically provided * * * over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.

16 U.S.C. § 824(b). Exemptions are also provided for governmental units and corporations, 16 U.S.C. § 824

(f), for one engaged in transmission or sale of electric energy but not otherwise subject to the Act who makes a temporary emergency connection with a public utility subject to the jurisdiction of the Commission, 16 U.S.C. § 824a(d), and for certain international exports, 16 U.S.C. § 824a(f).

Congress defined interstate transmission as follows:

> [E]lectric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof.

16 U.S.C. § 824(c). The Supreme Court has credited the Congress with determining that "federal jurisdiction was to follow the flow of electric energy, an engineering and scientific rather than a legalistic or governmental test." *Connecticut Light & Power Co. v. FPC, supra.* Commission power does not extend over all connecting transmission facilities but only those which transmit energy actually moving in interstate commerce. Mere connection determines nothing. *Jersey Central Power & Light Co. v. FPC,* supra, at 72, 87 L.Ed. at 1269.

The concept of following the flow of electric energy from one state to the other was easy to apply in *Attleboro.* A Rhode Island electric company delivered energy over its Rhode Island transmission lines to the facilities of a Massachusetts electric company which had no generating capacity. Now generating companies are interconnected with each other nationwide. Companies have formed area and regional power pools, with varying degrees of integration and centralized management. The Commission itself has power to establish regional districts for voluntary interconnection and coordination of facilities and to promote such interconnection and coordination. 16 U.S.C. § 824a(a).

Interconnection has become a fact of life to meet needs, scheduled and emergency, of localized areas and large regions.[2]

2. THE INSTANT CASE

FPL produces and sells electric energy in eastern and southern Florida. But it is a major electric company.[3]

The Commission opinion describes FPL's interconnections:

> FPL is directly interconnected with four other Florida electric systems, as follows: Florida Power Corporation (Corp), Tampa Electric Company (Tampa), Orlando Utilities Commission (Orlando), and the City of Jacksonville (Jacksonville). FPL, Corp, and Tampa form the Florida Operating Committee (Florida Pool) with Jacksonville and Orlando as associate members. The Florida Pool meets several times a year to consider mutual problems relating to the interconnected operation of the systems, including the coordination of spinning reserves, the arrangement of compatible plant maintenance schedules, and the coordination of plans for the construction of transmission lines and the staggered construction of generating units.
>
> * * * * *

[2] The examiner noted the Northeast power failure of 1965, which plunged large sections of the eastern United States into darkness.

[3] In 1965 it served nearly one million customers, ranked ninth nationally among electric companies in revenues, fourteenth in investment in gross electric utility plant, and sixteenth in kilowatt hour sales. Six of its customers are electric cooperatives, and it occasionally sells to municipal electric systems on an emergency basis. Because of the frequent threat of hurricanes severing its transmission lines, FPL attempts to be self-sufficient, even within different segments of its system.

Corp, which is interconnected with Tampa and Orlando as well as with FPL, is also interconnected with power companies outside of the State of Florida. Thus, it is directly interconnected with Georgia Power Company (Georgia), a subsidiary of The Southern Company (Southern). Southern is a holding company whose other subsidiaries are Gulf Power Company (Gulf) which operates in northwestern Florida, Alabama Power Company (Alabama), and Mississippi Power Company (Mississippi). Corp is also directly interconnected with Gulf, and Gulf is interconnected with Georgia and Alabama. Corp has an agreement with the subsidiaries of Southern whereby Corp makes 100,000 kw available to these subsidiaries during the summer, and in return, the subsidiaries make 100,000 kw available to Corp during the winter. During 1964 Southern delivered 167,476,000 kwh to Corp, and Corp delivered 157,324,000 kwh to Southern. Of these totals, approximately 97,000,000 kwh represented deliveries from Georgia to Corp, and 82,000,000 kwh represented deliveries from Corp to Georgia. In addition, 3.9 million kwh were wheeled for the Southwestern Power Administration over Southern's lines across the Georgia-Florida state line to Corp. Georgia is also interconnected with Duke Power Company, Tennessee Valley Authority, and Southeastern Power Administration. These systems operate in states beyond Georgia.

FPL and the other members of the Florida Pool are also members of a multi-state electric network, the Southeast Region of the Interconnected Systems Group (ISG) which covers the southeastern and central portions of the United States. FPL's membership in the ISG provides acceptable frequency control and also automatic assistance during emergencies in the event of any generation outage of less than

100 mw on its system. In this connection it may be noted that 12 of FPL's 24 generating units generate 75 mw or less. An outage of any of these units would lead to almost instantaneous assistance to FPL. FPL, in turn, operates in synchronism with the 140 members of ISG and is ready to assist them in case of emergency. Thus, FPL contributed 8 mw to ISG to assist a midwestern utility which had sustained a 580-mw generator loss.

The Commission position is best explained by quoting from its opinion:

> The testimony and evidence of record support the examiner's findings that the electric power on all the interconnected systems in which FPL, Corp, and Georgia participate is supplied as alternating current at a frequency of 60 cycles; that the frequency of each system is in synchronism with that of all the others in the interconnection; that there is a tie-line bias with frequency control on the interconnected systems which permits a free flow of power and energy throughout the networks in which FPL, Corp, and Georgia participate; that all 140 members of the ISG operate in parallel and are interlocked electromagnetically; and that FPL can receive from or contribute to ISG up to 100 mw. The record further supports the examiner's findings that FPL normally has no control over the actual transfers of electric power and energy with any particular electric system with which it is interconnected; that since electric energy can be delivered virtually instantaneously when needed on a system at a speed of 186,000 miles per second, such energy can be and is transmitted to FPL when needed from out-of-state generators, and in turn can be and is transmitted from FPL to help meet out-of-state demands; and finally, that there is a cause and effect relationship in electric

> energy occurring throughout every generator and point on the FPL, Corp, Georgia, and Southern systems which constitutes interstate transmission of electric energy by, to, and from FPL.
>
> In its exceptions FPL argues that there is no substantial record support for the examiner's finding that it is engaged in the transmission of electric energy in interstate commerce. We find no merit in this argument. The examiner concluded that the operation in FPL in electromagnetic unity with the suppliers in and outside of Florida in and of itself demonstrated that it owned and operated facilities for the interstate transmission of electric energy. This finding is also supported by the evidence produced by staff at the hearing which convincingly establishes that electric energy is transmitted in interstate commerce to and from FPL's lines.

The Commission adopted the examiner's findings. Two are basic. First, that ownership and operation of facilities for interstate transmission was proved by reason of FPL's interconnection with other systems inside and outside of Florida "in electromagnetic unity of response," without any necessity of tracing the path of any interstate electrical energy. Second, that if tracing was considered essential, there had been interstate transmission to and from FPL's lines, based on the Commission's staff studies, which were predicated upon the "commingling theory" of the transmission of electric energy. It is not clear to us whether the examiner and the majority of the Commission considered commingling as undergirding the electromagnetic unity of response theory or as irrelevant to it. The dissenters appeared to treat the two concepts as one, pursuant to which at all times an interconnected network is "permeated" with free flowing electric energy.

The nature and effects of the concept of "electromagnetic unity of response" were described by the examiner approximately as follows. The interconnected systems supply alternating current on the same frequency, 60 cycles per second, with the frequency of each system in synchronism with that of all other systems in the interconnection. The speed of all generators on the interconnected systems is irrevocably locked to the same frequency. A response mechanism known as tie line bias control regulates output in individual systems so that total overall generation matches as closely as possible the total overall load. When at any point a change in load occurs or a generator is taken out of service, this will affect every point on the interconnected systems. For example, every connected generator on the interconnected systems will contribute energy to compensate for any additional load to maintain the balance between total overall generation and total overall load and thereby maintain frequency at 60 cycles. The immediate effects of load or generation changes are dispersed throughout the electromagnetically interlocked generators of the interconnected systems. The magnitude of change in instantaneous generation and frequency will tend to diminish as the distance from the point of load or generation change increases. As such changes occur tie line bias control operates to restore the net interchange of power between each system and its neighbors to the former prearranged level.[4]

[4] The automatic, nonscheduled transfers effected by tie line bias control are not the sole or even the most important transfers among systems. For a variety of reasons, electric companies agree to swap power. Scheduled transfers include seasonal sales, like those between Southern and Corp; other economy sales, made profitable by differences in marginal efficiency among production plants, Indiana and Michigan Electric Co. v. FPC, 365

In our example above, the particular system on which total load increased will automatically increase its own generation to supply the additional load, and the other systems correspondingly will reduce their temporarily increased electric generation. No attempt is made to control flows of electric energy in individual lines (in fact, electric systems normally have no control over actual transfers of energy between them, if there is more than one interconnection), because the flows are determined by the electric characteristics of the overall network. Only the net of flows is controlled, by increasing or decreasing generation so as to maintain scheduled transmissions of power (both within a system and between systems). Thus there is free flow of electric energy throughout the overall network but limited by control of the net of flows, frequency changes, tie line bias, and the responses of generators to load changes.

The examiner stated that nobody can say for certain just how electricity is really transmitted, but that "the answer is not important for legal purposes." He found:

> The cause and effect relationship in electric energy occurring throughout every generator and point on the Georgia, Corp and Florida systems constitutes interstate transmission of electric energy by, to, and from Florida. It is the electromagnetic unity of response of Florida, Corp, Georgia and other interconnecting systems that constitutes the interstate transmission of electric energy by Florida.

F.2d 180 (7th Cir.), *cert. denied*, 385 U.S. 972, 17 L.Ed. 2d 435 (1966); and transfers to compensate for temporary needs such as plant maintenance, as in the Florida Operating Committee arrangements.

We conclude that the complex relationship of cause and effect in interconnected and synchronized systems is, as to FPL, not sufficient to prove the actual transmission of energy interstate. It tells us what, as to that company, could occur. It does not tell us with any substantial degree of certainty what does occur.

This is not to say that "electromagnetic unity of response," with the reasonable inferences which may be drawn therefrom, may not be a part of substantial evidence of interstate transmission, as in the "power pool" cases discussed below. But, standing alone, as to FPL it is not substantial evidence establishing that when energy flows from Corp's lines to Georgia's lines, either scheduled or in response to frequency drop in the state of Georgia or somewhere further distant, the Florida power transmitted is Corp's plus FPL's and not Corp's alone, and conversely that when energy flows from Corp to FPL it is not Corp's alone but mixed with power generated outside Florida.[5] The Commission referred, at the end of the excerpt first above quoted, to FPL's contribution of 8 mw to ISG during an outage in the midwest. That "contribution" does not necessarily mean that power was transmitted interstate from FPL to the midwest. Although the effect of FPL's transmission was to increase the total wattage available to the whole system,

[5] We have focused, as did the examiner and the Commission, on interstate transmission in terms of FPL's interconnection with Corp. But the theory of interconnection and synchronization is applicable to the outermost ends of all interconnected systems. Thus, under this theory a direct interconnection of FPL with Corp is unnecessary because, for example, FPL interconnects with Tampa and Orlando in the Florida Pool, and those two companies are interconnected with Corp, which interconnects to Gulf, which interconnects to Alabama.

the "electromagnetic unity of response" theory is equally compatible with either the Commission's "permeation" assumption or the hypothesis that the power transmitted by FPL was consumed by Corp, another eight mw being passed on by Corp for further use or transmission.

Turning to the second basic finding of energy actually traced, the supporting evidence of actual transmissions referred to by the Commission consists of staff studies purporting to trace energy from Georgia through Corp's substation in Florida into FPL's system, and at other times over the same lines from FPL to Corp to Georgia. These studies are predicated upon the commingling theory, which is simply a method of conceptualizing the complex and not yet fully explainable flow of electric energy. FPL asserted the validity of a different theory, the "systems study method."[6] The difference between this method and the commingling method relied on by the Commission lies in their assumptions about the nature of the transmission bus, a collection and transmission facility for electric power, for example, a substation. The systems study method assumes that it is possible to measure the magnitude and direction of flows within a bus as well as along transmission lines between buses. Relying on this assumption, FPL introduced measurements tending to show that for each point in time at which the Commission attempted to trace power from Georgia to FPL there was in fact a reversal in flow through the bus away from FPL's connection either on the Corp-FPL bus or on some other bus earlier in the trace through Corp's system. Finding on each bus

[6] This is a variation of the so-called steady state method used for accounting and planning purposes in the electric power industry.

the connection which brought power from the direction of Georgia, and totaling the inputs and outflows through other connections on the bus in the direction of FPL's connection, FPL calculated that inputs over this part of the bus were greater than outflows. Under the systems study assumptions, then, power could only flow in the opposite direction through the bus, away from FPL's connection.

The staff did not disprove the correctness *vel non* of these measurements by FPL.[7] Instead the staff urged that the steady state method of describing the flow of three-phase power is inadequate and that the flow is best conceptualized by the commingling theory.

Modern electric utilities generate alternating current electricity. The steady state method treats the flows and counterflows of alternating current as unidirectional and measures only the net of the flows and counterflows. This simply ignores that alternating current is not unidirectional.[8] The commingling concept too treats power flows as only net quantities. But the bus is treated as a "tank" or a "reservoir." The energy flowing to each load on the bus is attributed to each source of energy in the proportion that the source contributes to the total energy flowing into the bus. If at any instant the net flow of power is toward a system—that is, its load is more than its generation—it is assumed that at that moment some portion of the

[7] Counsel for the Commission attempted to do so by a chart, first presented on appeal, which purported to show by the steady state method that interstate power reached FPL. The petitioner did not have a chance to question or controvert in a factual hearing assumptions underlying this chart, so we may not consider it on this appeal.

[8] Staff experts testified that the deficiencies of the steady state method could be corrected by measuring counterflows of energy.

power being consumed by that system flowed into it from every other system contributing to the "tank" or "reservoir" at the bus.[9] Neither the examiner nor the Commission treated the commingling theory as a scientific fact depicting accurately what does occur but only as the more adequate way to conceptualize actual occurrences.[10]

The Commission expert witness Jacobsen acknowledged commingling has never been verified experimentally as fact. The following interchange took place during the hearing before the examiner:

> PRESIDING EXAMINER. I take it the theories are not necessarily right or wrong. How does your theory better explain the facts?
>
> THE WITNESS. [Commission expert]: I think that would be a better question.

In some contexts the commingling method may be a more useful tool for analysis than steady state methods, but this is not to say that it is adequate for all purposes. Both suffer from the same vice of creating a construct which departs from the actual manner in which electricity operates and then attempting to trace the consequences. The engineering and scientific fact test for interstate flow of energy is not met by postu-

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[9] Although we do not rest our decision on this testimony, we note that an expert for FPL calculated that, if it be conceded that commingled power flowed from Georgia to FPL under the Commission's assumptions, the interstate component of the power flowing from Corp into the FPL substation at Sanford, Florida would be only 0.07%, and that as a portion of the energy then being delivered by FPL to its consumers, this interstate energy would amount to only 0.00015%.

[10] Thus the examiner stated:

> "[S]everal explanations may be sufficient [to account for the amount of electric energy at any one point] but none may possess the uniqueness necessary for proof."

lating a simplified characterization of how, for various purposes of convenience, energy may be treated as flowing.

3.

The "engineering and scientific" test based on actual power flow was articulated in *Connecticut Light & Power*. In that case, in the next following words the Supreme Court said:

> Technology of the business is such that if any part of a supply of electric energy comes from outside of a state it is, or may be, present in every connected distribution facility.

324 U.S. at 529, 89 L.Ed. at 1160. We do not construe this language as obviating the necessity for showing interstate transmission of power. In context the Supreme Court was discussing not the technological transmission test but the exception from FPC jurisdiction of "facilities used in local distribution." 16 U.S.C. § 824.

The Commission bears the burden of proving its asserted jurisdiction. *Public Service Co. of Indiana v. FPC,* 375 F.2d 100, 104 (7th Cir.), *cert. denied,* 387 U.S. 931, 18 L.Ed. 2d 992 (1967); *Arkansas Power & Light Co. v. FPC,* 368 F.2d 376 (8th Cir. 1966). In attempting to meet this burden, the Commission does not rely upon the two "straight status" cases that have been adjudicated by the Supreme Court, *Connecticut Light and Power* and *Jersey Central,* neither of which supports its approach in this instance. Instead it turns to the cases in which jurisdiction has been found over wholesale sales "in interstate commerce" and adapts their methodology. *Cincinnati Gas & Elec. Co. v. FPC,* 376 F.2d 506 (6th Cir.), *cert. denied,* 389 U.S. 842, 19 L.Ed. 2d 106 (1967); *Public Serv-*

ice Co. of Indiana v. FPC, supra; Arkansas Power & Light Co. v. FPC, supra; Indiana and Michigan Electric Co. v. FPC, 365 F.2d 180 (7th Cir.), *cert. denied,* 385 U.S. 972, 17 L.Ed. 2d 435 (1966); see also *Pennsylvania Water & Power Co. v. FPC,* 343 U.S. 414, 96 L.Ed. 1042 (1952). *Pennsylvania Water* concerned wholesale sales of an admitted public utility, as defined by the Act, which was part of a system integrated with a Maryland company. During periods of low flow on the Susquehanna River it received substantial amounts of power from the Maryland company, and it was not contested that some interstate energy reached each of its customers.

Each of the four companies in the "power pool" cases from the Sixth, Seventh and Eighth Circuits was likewise a public utility within the meaning of the Act. Each of them also participated in an integrated power pool centrally directed to maximize efficiency by economy transfers and to provide emergency power. CG&E, PSCI and I&M were all members of the American Electric Power System (AEP) spanning several midwestern states, and Arkansas Power & Light was a member of a similar pool operation including utilities in three southern states.

Each of these cases rests on far more than interconnection plus electromagnetic unity of response plus commingling. In both *CG&E* and *Arkansas Power & Light,* limited samples showed that some of the petitioners' wholesale customers received out of state energy. In each case, the company's principal contention was that tracing was necessary to establish the presence of out of state energy in its wholesale transmissions to its remaining customers as well. In each case the utility's membership in a pool, and its consequent regular purchases for economy and other rea-

sons of power generated in other states, justified an inference that not just some but all of its wholesale sales contained interstate energy.

In *I&M* and *PSCI*, the Commission traced no interstate energy to any wholesale customer. In *I&M*, this may have been unnecessary, since there was evidence that for substantial periods of time Illinois energy supplied at least large portions of north central Indiana and southwest Michigan, thereby bringing this case close to *CG&E* and *Arkansas Power & Light*, *PSCI* is the most far-reaching case. But the court in that case rested squarely on *I&M*, finding that the company's participation in the integrated AEP network, in view of the impossibility of tracing, justified the inference that some of the interstate power which demonstrably flowed in PSCI's lines reached each of its wholesale customers.

We agree with the court in *Arkansas Power & Light, supra*, at 383, n.8, that establishing wholesale rate jurisdiction over an electric company which is a public utility within the Act is a different matter from establishing plenary jurisdiction over a company based on interstate transmission. A consideration in the wholesale sale case is the seeming irrationality of allowing Commission jurisdiction over wholesale sales to which experts can trace some out of state energy, but not over those to which it might be impossible to trace interstate power, when it is obvious that there is interstate power in substantial portions of the utility's system. *Cf Arkansas Power & Light, supra*. Another consideration is the seeming irrationality of a public utility with interstate electric energy flowing in its system escaping FPC jurisdiction over wholesale sales because of impossibility of proof arising from the inadequacy of instruments used by the utility itself. *Cf. Indiana & Michigan, supra*. These con-

siderations have little application to the problems of federalism and reservations of power to the states imposed by the instant case, where the issue is one of whether FPL is a public utility at all, measured under tests articulated by the Congress and the courts in terms of actual transmissions of interstate energy.

Some of the wholesale rate cases have relied heavily on the respective companies' participation in an integrated interstate power pool, which provided power more or less continuously, in substantial amounts, and with economy transfers. Neither FP[L] nor Corp is shown to be a member of such a pool.

To the extent that the above wholesale rate decisions purport to rest on a theory of commingling, that theory is nowhere discussed in the context in which it is presented in this case. The term "commingled" appears to have originated in *Pennsylvania Water,* where it was used as a descriptive term for the Court's conclusion that some interstate power must have reached each wholesale customer. None of the subsequent power pool cases gives extended discussion to the scientific ramifications of the Commission's similarly conclusory findings that commingled energy reached each wholesale customer.

The consequences of the Commission's electromagnetic unity theory, with or without the additive of the commingling concept, as a basis for jurisdiction were described by the dissenters in this way:

> The vice I find in the Commission's decision, which prevents me from joining in its statement, is that its adoption of the commingling theory as a test for jurisdiction *per se,* interprets the Federal Power Act to have a reach beyond that which I find in the statute.
>
> The Federal Power Act is today found to grant to the Commission jurisdiction over *any*

company which generates electric energy in the form of alternating three-phase 60-cycle current, if that company is interconnected and electromagnetically synchronized with any other generating source producing electric energy in the same form in another State.

More than 90% of the Nation's electric generating capacity is interconnected in this fashion.[11] The only major exception is the electric generation of Texas, which is interconnected within Texas but not with out-of-Texas systems. Such a test for jurisdiction writes out of the statute the intrastate and industrial exceptions to coverage under the Act, and in doing so objectionably usurps a prerogative of the Congress.[12] (Emphasis in original.)

* * * * *

If commingling obviates tracing, then the reach of the Commission's jurisdiction is plenary. Furthermore, it has become plenary in 1967, while the act was passed in 1935 and has not been changed by Congress (in respects material here) since.

* * * * *

The stated purpose of section 202 was to assure an abundant supply of economical energy by *voluntary* interconnection of facilities. If jurisdiction inexorably follows interconnection, the nonjurisdictional utilities cannot retain any aspect of their independence once they agree

[11] The examiner's description of scope was no less cogent.

"The electric systems of Florida and all other interconnected systems are essentially alike as to electrical, electromagnetic and electromechanical characteristics. Because they are alike, it is possible to have presently existing interconnected operations on a very large scale, extending from the Rocky Mountains to the Atlantic Ocean and from the Canadian to the Mexican border.

[12] The exceptions are set out in part 1 of this opinion.

> to interconnect. Impregnation is indivisible. Such a reading of section 202 is hardly conformable to its general spirit, and is inconsistent with the legislative history, of this part of the Act. (Emphasis in original.)

The qualities of electric energy have long been familiar. If the free flowing character of electricity *vel non* proved interstate transmission then connection, rather than proving nothing, *Jersey Central Power & Light Co. v. FPC, supra,* at 72, 87 L.Ed. 2d at 1269, proves everything, if it is made to any point of the synchronized system that spans most of this country.

The impact of these consequences is pointed up by two other factors: the principle that for determining existence of jurisdiction the quantity of energy transmitted interstate is immaterial,[13] and the implication by the majority of the Commission in the present case that they may be of the view that if the Commission has jurisdiction it cannot in the exercise of discretion decline to exercise it.

To attach federal agency jurisdiction is to supplant[14] or parallel[15] the regulatory schemes of the states. Congress avoided any such entry into the field where the Attleboro gap poses no bar to state regulation.

What the Commission virtually argues for in this case is extension of its jurisdiction to all electric companies affecting interstate commerce. Our society grows increasingly more complex, more dependent

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[13] Connecticut Light and Power Co. v. FPC, *supra;* Wisconsin-Michigan Power Co. v. FPC, 197 F.2d 472, 478 (7th Cir.) *cert. denied*, 345 U.S. 934, 97 L.Ed. 1362 (1953).

[14] *E.g.*, in wholesale ratemaking, 16 U.S.C. § 824d.

[15] *E.g.*, in accounting requirements, 16 U.S.C. § 825.

upon electric energy, and the interconnection of electric systems is ever more pervasive. But such an extension of Commission power, if determined to be in the national interest, is for the Congress and not for this court.

The petition for review is *granted* and the order of the Commission is *reversed.*

APPENDIX B

In the United States Court of Appeals for the Fifth Circuit

OCTOBER TERM, 1969

No. 24956

FLORIDA POWER & LIGHT COMPANY, PETITIONER,

v.

FEDERAL POWER COMMISSION, RESPONDENT

PETITION TO REVIEW AND SET ASIDE OPINION AND ORDERS OF THE FEDERAL POWER COMMISSION (FLORIDA CASE)

Before BELL, AINSWORTH and GODBOLD, *Circuit Judges.*

JUDGMENT

This cause came on to be heard on the petition of Florida Power & Light Company, for review of orders of the Federal Power Commission in Docket No. CA 13450, and was argued by counsel;

ON CONSIDERATION WHEREOF, It is now here ordered and adjudged that the petition for review is granted and that the orders of the Federal Power Commission in this cause be, and the same are hereby reversed.

JULY 13, 1970.

Issued as Mandate: Aug. 4, 1970.

APPENDIX C

(Opinion No. 517)

FLORIDA POWER & LIGHT COMPANY, DOCKET NO. E-7210

OPINION AND ORDER DETERMINING JURISDICTION

(Issued March 20, 1967)

Before Commissioners: Lee C. White, Chairman; L. J. O'Connor, Jr., Charles R. Ross, Carl E. Bagge and John A. Carver, Jr.

WHITE, *Chairman:*

This is a proceeding to determine whether the Florida Power & Light Company (FPL) is a public utility within the meaning of Section 201 of the Federal Power Act, and whether it should be required to maintain its accounts in accordance with the Commission's Uniform System of Accounts for Public Utilities and Licensees.

The Commission instituted the investigation in this docket on February 26, 1965, 33 FPC 328. The Florida Public Service Commission (Florida Commission) filed notice of intervention dated March 17, 1965, and thereafter the City of Clewiston, Florida (Clewiston), was granted limited intervention.[1] Hearings were held

[1] On September 7, 1965, Clewiston filed a complaint in Docket No. E-7243, requesting that the Commission order FPL, pursuant to Section 202(b) of the Act, to connect its facilities with those of Clewiston and render direct wholesale service at rea-

on October 4, 5, 7, 8, and 12, 1965, and again on November 3, 1965. On July 12, 1966, the Presiding Examiner Seymour Wenner, issued an initial decision in which he found that FPL owns and operates facilities, among others, for the transmission of electric energy transmitted from points of generation in the States of Georgia and Florida to points of consumption outside the state in which it is generated, and therefore is a public utility under Section 201 of the Act, subject to the Commission's jurisdiction.

He further held that FPL must file original cost statements as provided in the Commission's Uniform System of Accounts Prescribed for Public Utilities and Licensees Subject to the Provisions of the Federal Power Act, and that it must comply with all other requirements of the Commission's Regulations under such Act.

The proceeding is before the Commission on the examiner's decision, exceptions filed by FPL and the Florida Commission, and staff's opposition to these exceptions. FPL and the Florida Commission contend that there is no substantial evidence in the record to support the examiner's finding that FPL transmits electric energy in interstate commerce, and they urge that the Commission, in the exercise of its discretion, should in any event decline jurisdiction over FPL. Oral argument was held before the Commission on November 28, 1966.

For the reasons set forth below we find that FPL's and the Florida Commission's exceptions are not persuasive and do not warrant our reversal of the exam-

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sonable rates. After the hearings, Clewiston negotiated a rate settlement with its power suppliers (U.S. Sugar Corporation and Glades Electric Cooperative, Inc.), and moved for the dismissal of its application in Docket No. E-7243. The motion was granted on July 6, 1966, 36 FPC 17.

iner's decision. It is our opinion that the basic findings of fact and the conclusions of law in the examiner's comprehensive initial decision are fully supported by the evidence of record, and that these findings and conclusions, as supplemented by our discussion herein, should be approved. We agree with the examiner that FPL owns and operates facilities for the transmission of electric energy in interstate commerce, that these facilities do not fall within the local distribution exemption provisions of Section 201(b) of the Federal Power Act, and that FPL must file original cost statements and comply with all other requirements of the Commission's Regulations under such Act.

Inasmuch as the examiner's decision sets forth in detail the factual background of this proceeding and the legal principles applicable thereto, we shall not recite the factual details in full, but shall refer essentially to those raised by FPL and the Florida Commission in their exceptions.

The record shows that FPL is engaged in the generation, transmission, distribution, and sale at wholesale and at retail of electric energy in the State of Florida. It is the largest electric utility in the state, with a net dependable generating capacity of 2.8 million kw, and it supplies service to about 931,400 customers in more than 500 cities, rural communities and adjacent areas. As of December 1964,[2] it operated ten steam-electric generating plants interconnected by a transmission grid of 2,500 miles, of which 1,400 miles operate at high voltage, 115 kv or above. On the basis of national standing, FPL is one of the most important electric utilities in the United States. In 1965 its rank was ninth nationally in revenues, fourteenth

[2] Unless otherwise noted, the figures stated are approximate and are for the calendar year 1964.

in investment in gross electric utility plant, and sixteenth in kilowatt hour sales.

FPL is directly interconnected with four other Florida electric systems, as follows: Florida Power Corporation (Corp), Tampa Electric Company (Tampa), Orlando Utilities Commission (Orlando), and the city of Jacksonville (Jacksonville). FPL, Corp, and Tampa form the Florida Operatin Committee (Florida Pool) with Jacksonville and Orlando as associate members. The Florida Pool meets several times a year to consider mutual problems relating to the interconnected operation of the systems, including the coordination of spinning reserves, the arrangement of compatible plant maintenance schedules, and the coordination of plans for the construction of transmission lines and the staggered construction of generating units. The spinning reserves of the Florida Pool equal the generating capacity of the largest single unit of the five-member systems, and by voluntary agreement of the members, are shared proportionally. According to FPL's reports in its FPC Form No. 12 for 1964, its required reserve capacity for that year was 404,000 kw, of which amount it supplied 172,000 kw. The balance of 232,000 kw was reported as being available from the other members of the Florida Pool.

FPL exchanges a substantial amount of electric energy with the other members of the Florida Pool. During 1964 FPL transferred a total of 189,422,000 kwh to the four other Pool members, and received in return a total of 199,059,000 kwh, itemized as follows:

Kwh transferred from FPL to:	
Corp	107,642,000
Tampa	43,081,000
Jacksonville	17,268,000
Orlando	21,431,000

Kwh transferred to FPL from:	
Corp	61,589,000
Tampa	59,404,000
Jacksonville	18,181,000
Orlando	59,876,000

The electric energy interchanged by FPL in 1964 totaled three percent of its net generation of 12 billion kwh.

Corp, which is interconnected with Tampa and Orlando as well as with FPL, is also interconnected with power companies outside of the State of Florida. Thus, it is directly interconnected with Georgia Power Company (Georgia), a subsidiary of The Southern Company (Southern). Southern is a holding company whose other subsidiaries are Gulf Power Company (Gulf) which operates in northwestern Florida, Alabama Power Company (Alabama), and Mississippi Power Company (Mississippi). Corp is also directly interconnected with Gulf, and Gulf is interconnected with Georgia and Alabama. Corp has an agreement with the subsidiaries of Southern whereby Corp makes 100,000 kw available to these subsidiaries during the summer, and in return, the subsidiaries make 100,000 kw available to Corp during the winter. During 1964 Southern delivered 167,476,000 kwh to Corp, and Corp delivered 157,324,000 kwh to Southern. Of these totals, approximately 97,000,000 kwh represented deliveries from Georgia to Corp, and 82,000,000 kwh represented deliveries from Corp to Georgia. In addition, 3.9 million kwh were wheeled for the Southwestern Power Administration over Southern's lines across the Georgia-Florida state line to Corp. Georgia is also interconnected with Duke Power Company, Tennessee Valley Authority, and Southeastern Power Administration. These systems operate in states beyond Georgia.

FPL and the other members of the Florida Pool are also members of a multi-state electric network, the Southeast Region of the Interconnected Systems Group (ISG) which covers the southeastern and central portions of the United States. FPL's membership in the ISG provides acceptable frequency control and also automatic assistance during emergencies in the event of any generation outage of less than 100 mw on its system. In this connection it may be noted that 12 of FPL's 24 generating units generate 75 mw or less. An outage of any of these units would lead to almost instantaneous assistance to FPL. FPL, in turn, operates in synchronism with the 140 members of ISG and is ready to assist them in case of emergency. Thus, FPL contributed 8 mw to ISG to assist a midwestern utility which had sustained a 580-mw generator loss.

The testimony and evidence of record support the Examiner's findings that the electric power on all the interconnected systems in which FPL, Corp, and Georgia participate is supplied as alternating current at a frequency of 60 cycles; that the frequency of each system is in synchronism with that of all the others in the interconnection; that there is a tie-line bias with frequency control on the interconnected system which permits a free flow of power and energy throughout the networks in which FPL, Corp, and Georgia participate; that all 140 members of the ISG operate in parallel and are interlocked electromagnetically; and that FPL can receive from or contribute to ISG up to 100 mw. The record further supports the Examiner's findings that FPL normally has no control over the actual transfers of electric power and energy with any particular electric system with which it is interconnected; that since electric energy can be delivered virtually instantaneously when needed on a system at

a speed of 186,000 miles per second, such energy can be and is transmitted to FPL when needed from out-of-state generators, and in turn can be and is transmitted from FPL to help meet out-of-state demands; and finally, that there is a cause and effect relationship in electric energy occurring throughout every generator and point on the FPL, Corp, Georgia, and Southern systems which constitutes interstate transmission of electric energy by, to, and from FPL.

In its exceptions FPL argues that there is no substantial record support for the Examiner's finding that it is engaged in the transmission of electric energy in interstate commerce. We find no merit in this argument. The Examiner concluded that the operation of FPL in electromagnetic unity with the suppliers in and outside of Florida in and of itself demonstrated that it owned and operated facilities for the interstate transmission of electric energy. This finding is also supported by the evidence produced by staff at the hearing which convincingly establishes that electric energy is transmitted in interstate commerce to and from FPL's lines. The nature of staff's showing is fully consistent with, and satisfies the tests which we have established in numerous opinions issued in the last two years to support a finding that wholesale sales are in interstate commerce. See *Indiana & Michigan Electric Company,* Opinion No. 458, 33 FPC 739, affirmed *Indiana & Michigan Electric Company* v. *Federal Power Commission,* 365 F. 2d 180 (CA7–1966), certiorari denied, 385 U.S. 972; *Arkansas Power & Light Company.* Opinion No. 473, 34 FPC 747 (1965), affirmed *Arkansas Power & Light Company* v. *Federal Power Commission,* 368 F. 2d 376 (CA8–1966); *Public Service Company of Indiana, Inc.,* Opinion No. 483, 34 FPC 1513 (1965), affirmed

in *Public Service Company of Indiana, Inc.* v. *Federal Power Commission*, 375 F. 2d 100 (CA7–1967); the *Cincinnati Gas & Electric Company*, Opinion No. 485, 35 FPC 99 (1966). Certainly it is reasonable to rely on the methodology used in the above cases to demonstrate that particular sales are in interstate commerce to establish in this proceeding that FPL itself is engaged in the interstate transmission of electric energy and is thus a "public utility" within the meaning of the Act.

Thus through the application of the same techniques here that it had utilized in those other cases staff demonstrated by its record exhibits the flow of energy from Georgia across the Georgia-Florida state line through Corp's system and into FPL's transmission lines, as well as a reverse flow from FPL's lines through Corp's system to Georgia. See Staff's Exhibit Nos. 18, 19, 32, and 33.[3] For example, Staff's Exhibit No. 18, at page 6, graphically demonstrates that on September 28, 1964, at 7:00 o'clock p.m., there was a flow of 51,000 kw of interstate power from Georgia to Corp and an instantaneous flow of 50,000 kw of commingled interstate and intrastate power from Corp to FPL. We are not persuaded by FPL's exceptions that the Examiner committed error in basing his findings on such staff exhibits rather than on FPL's

[3] Staff's Exhibit No. 18 shows the flow of energy from Georgia through Corp's system and into FPL transmission lines via the Jasper-Fort-White-Turner-Sanford interconnections on designated hours of 22 days out of a 4-month period in 1964. Staff Exhibit No. 19 indicates the presence of such flows during hours earlier than 7:00 a.m. on 20 of the 22 days listed in Exhibit No. 18. Staff Exhibit No. 32 further shows that energy transmitted from FPL's Sanford Plant flowed during 3 days of the same 4-month period over Corp lines into the Georgia Power System via the Turner-Fort-White-Jasper interconnections.

own system studies which FPL contends show that no Georgia energy can enter the FPL lines and that no FPL energy can flow as far north as Georgia.

As ably explained by the Examiner, the power flow studies prepared by staff all rest on the concept that there is a commingling of energy from different sources at a bus with the result that the energy which flows away from such bus is so fully commingled as to consist of energy which has entered such bus both from interstate and intrastate sources. Staff recognizes that energy flows to and from a bus as three-phase alternating current, and staff treats a bus as a point, or a tank, or a reservoir where all the energy supplied to the bus is commingled. The studies prepared by FPL, on the other hand, treat the bus as having physical dimensions, and replace each three-phase alternating current bus structure by a single conductor bus. FPL uses the point-to-point tracing principles of direct current circuits with static power sources and with steady state power flows. This steady state method treats the power flow through the bus as constant in value and direction, on the basis that balanced three-phase power under steady state conditions is constant in value and direction from instant to instant. Although FPL's method may lend itself to a theoretical showing of energy flow which may demonstrate that energy will flow from a certain source to a certain load,[4] this method does not fully or accurately reflect

[4] The steady state method was used to establish the fact of such a flow in *City of Colton, California* v. *Southern California Edison Company*, Opinion No. 346, 26 FPC 223, 234 (1961), *affirmed sub nom. Federal Power Commission* v. *Southern California Edison Company*, 376 U.S. 205 (1964), reversing 310 F. 2d 784 (CA9–1962). FPL's reliance on staff's use of the steady state method in *Colton*, however, is misplaced. As the Commission pointed out in its opinion in that case, the

the actual operation of a bus, and it does not show the physical reality of a three-phase electric power system as satisfactorily as does staff's concept. Certainly FPL's method is of no value in demonstrating a negative, namely, that energy will not flow through a bus to a certain specific transmission line. Yet, FPL's reliance on this method in this proceeding seeks to prove just such a negative.

The Examiner correctly found that staff's commingled method reflected the physical reality of the bus better than did FPL's steady state or systems studies method. The essential soundness of the commingled method has long been recognized and approved. See *Pennsylvania Water & Power Co.* v. *Federal Power Commission,* 343 U.S. 414 (1952); *Wisconsin Michigan Power Co.* v. *Federal Power Commission,* 197 F. 2d 472 (CA7–1952), cert. denied, 345 U.S. 934 (1953). Our adoption of the Examiner's holding on this point certainly is consistent with our repeated approval of the commingled method in recent jurisdictional proceedings where we have found a need for precise methods in analyzing power flows on highly complex systems involving a multiplicity of interconnections. See our opinions in *Indiana & Michigan* and *Arkansas,* cited at pp. 549, 550, *supra.*[5]

Consideration has been given to FPL's assertion that because of the unique peninsular nature of its service area it planned its system to be self-sufficient,

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result reached by staff's technique would have been the same had staff there treated the bus as a point under the commingling concept.

[5] In view of the above showing of substantial flows of interstate energy to and from FPL's system, it is clear that FPL owns facilities which do not come within the purview of the exemptions to the Commission's jurisdiction set forth in Section 201(b) of the Act.

and that it possesses sufficient generating capacity of its own to meet its loads without any dependence upon the spinning reserves or emergency power of other Florida or out-of-state systems. We do not find this assertion persuasive. The fact that FPL could operate as a self-sufficient utility is not controlling because FPL simply does not operate its system in that manner. The record in this proceeding makes it plain that FPL receives substantial benefits from its participation in the Florida Pool in the coordination of spinning reserves, the arrangement of plant maintenance schedules, and the assurance of reliability of frequency control and from both the Florida Pool and ISG in the form of automatic assistance in the case of emergencies. As we stated in our opinion in *Indiana & Michigan Electric Company, supra,* it is the system's actual mode of operation, not how the system could operate, that is important. Moreover, the particular operating pattern actually used by FPL is consistent with sound operating practices and with the principles enunciated in the Commission's National Power Survey issued in December 1964 in which all segments of the electric power industry participated fully and cooperatively.

We have also considered FPL's contention that it receives virtually no benefits from its membership in ISG with respect to emergency assistance because of its assertion that the Florida peninsula would be electrically isolated from the states to the north in the event of an outage of approximately 100 mw or greater This contention minimizes the fact that ISG aid to FPL is available as emergency assistance in the case of any outage of less than 100 mw. As we pointed out above, 12 of FPL's 24 generating units generate 75 mw or less. The emergency outage of any one of these units would automatically bring ISG aid to FPL in

the event that FPL's own reserves and the reserves of the other members of the Florida Pool were not instantaneously available. It appears that this is at least one of the contingencies which an emergency assistance agreement contemplates.

FPL urges that the Commission should decline to exercise jurisdiction in this proceeding, stating that any transmission of interstate energy which may have been accomplished is *de minimis*, and that the exercise of Commission jurisdiction would subject FPL to most burdensome additional costs without serving the public interest.

Assuming, *arguendo*, that we have discretion, this is not a case where the Commission should decline to exercise its jurisdiction. The Commission has already determined that jurisdiction does not depend upon a finding of any particular volume or proportion of interstate energy flowing in a system and this position has been upheld in the courts. *Connecticut Light and Power Company* v. *Federal Power Commission*, 324 U.S. 515, 535–536 (1945); *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U.S. 61 (1943); *Public Service Company of Indiana* v. *Federal Power Commission*, 375 F. 2d 100 (CA7–1967). Similarly, we do not believe that, where there are other benefits accruing to a company under the interconnected operating arrangements, the amount of energy flowing interstate should be decisive on the question of whether we ought to decline to exercise jurisdiction. Here the role played by FPL in the Florida Pool, in aiding Corp to interchange energy with Georgia and the other subsidiaries of Southern, and in the ISG is of greater significance than the actual volume of energy exchanged by it would ordinarily indicate. And this volume of energy, although

constituting but a small percentage of FPL's total generating capacity,[6] is nevertheless not insubstantial.

In considering FPL's request that we decline jurisdiction here, the Commission cannot ignore the fact that information recently filed by FPL in its Form No. 12 for 1965 shows that FPL's interchange of energy with other members of the Florida Pool was 300 percent greater in number of kilowatt hours in 1965 than in 1964. Nor can we ignore the record showing that the members of the Florida Pool, in considering their generating and transmission needs for 1970, have studied plans which contemplate stronger interconnections with the utilities in the Southern Company, to the extent of anticipating the capability of transfer of as much as 350,000 kw to 400,000 kw with Southern. FPL's role in these future plans for growth and interconnection obviously is a vital and significant one. As the largest electric utility in the State of Florida, and as one of the major electric utilities in the United States. FPL's importance in insuring the increased reliability of interconnected power systems in Florida and in adjoining states is self-evident. We do not believe than the public interest will be served by any Commission ruling which would tend to inhibit FPL from a sound and efficient expansion of its participation in the Florida Pool and ISG

[6] We do not find satisfactory record support for FPL's claim that the interstate energy which flows into its system is no more than 1/7000 of one percent of the total energy delivered to FPL's customers. FPL apparently arrived at this figure by assuming that the power flowing across the state line from Georgia could be traced to the Sanford-Turner interconnection between Corp and FPL. In so doing FPL ignored the effect of commingling of energy from different sources, and also ignored the fact that Georgia power may flow into its system over three other high voltage tie-lines.

interconnections. Yet FPL's request that we decline jurisdiction here because its past interstate transmission activities have allegedly been small, could, if granted, very well inhibit it from participating in future interconnection programs, and could conceivably cause it to restrict its present interconnection arrangements to its own detriment and to the detriment of other Pool members. Plainly, the public interest will not be served by this result.

The suggestion by counsel for FPL during the oral argument that we should wait to consider assuming jurisdiction until there is an actual complaint by a wholesale customer, either existing or potential, misconceives the broad statutory design which Congress had in mind in enacting Parts II and III of the Federal Power Act. Congress sought not only to give this Commission exclusive jurisdiction over wholesale sales in interstate commerce, but, in addition, to supplement local regulations at the federal level in such areas as accounting, interlocking directorates, mergers and consolidations, and the promotion of interconnection and coordination of the nation's facilities for the generation, transmission and sale of electric energy. None of these latter objectives depend upon the extent of wholesale sales or the percentage of interstate transmission in any particular case. The independent importance of these regulatory activities was spelled out in detail by the Commission, in light of the Act's legislative history, almost 20 years ago in the *Connecticut Light and Power* case, *supra*. FPL has presented no argument which would now persuade us to a contrary conclusion.

We agree with the Examiner that FPL will not be subjected to any unduly burdensome costs by our requirement that it keep its accounts in accordance with the Commission's Uniform System of Accounts for

Public Utilities. Although FPL asserts that it will incur more than $500,000 additional annual costs if it must comply with the Commission's accounting requirements, its contention is unsupported on the record before us. With respect to reporting, FPL presently files this Commission's principal report forms, FPC Form No. 1, Annual Report, and FPC Form No. 12, Power System Statement, as required under Section 311, among other sections, of the Power Act. Nor should any substantial expense result from FPL's compliance with the Commission's accounting requirements. FPL presently keeps its plant accounts on an original cost basis and maintains its books of account in accordance with the NARUC (National Association of Railroad and Utilities Commissioners) system of accounts which are similar to those of the Commission's Uniform System of Accounts.

FPL's further assertion that it will incur an estimated 4 to 6 million dollar expense to complete an initial plant inventory required by the Commission's Uniform System of Accounts is based upon indefinite and conjectural evidence, and plainly reveals a definite misunderstanding of what is required of it under the Commission's regulations. Thus, FPL's estimate of these costs erroneously includes the sum of approximately $3,200,000 for an aerial map survey of its system, when the Commission's requirements do not require such an aerial survey. Also, it appears that FPL's cost predictions are based upon costs incurred by other electric utilities in compiling their plant inventories for the Commission's regulatory purposes in prior years. The studies made by these other companies are not comparable because their plant accounts were not kept pursuant to a uniform

system of accounts at that time. On the other hand, FPL has been keeping its plant accounts on an original cost basis at least since 1951, and was required to make a complete reclassification of its plant accounts on an original costs basis by the Securities & Exchange Commission as of January 1, 1942. FPL's witness at the hearing admitted that to his knowledge FPL had not contacted any members of this Commission's accounting staff to obtain information concerning the requirements of complying with the Commission's Uniform System of Accounts, and also conceded a lack of knowledge as to whether or not FPL's reclassification studies accepted by the Securities & Exchange Commission in 1942 and the years thereafter would be accepted by the Commission. In this connection, it may be added that FPL apparently gave no weight to the fact that the Commission's auditing procedures are designed to avoid any unnecessary overlapping or duplication of state commission audits, and that joint federal and state audits are encouraged. In light of the foregoing circumstances, we find that the Examiner correctly concluded that it would not be burdensome for FPL to conform to the Commission's accounting requirements.

To the extent that FPL seeks exemption from the Commission's accounting requirements because its transmission of energy is predominantly intrastate, we deem it appropriate to restate our language in *The Connecticut Light and Power Company,* 6 FPC 104, 108 (1947), as follows:

> The legislative history of the Act shows, furthermore, that it was anticipated in Congress that the federal accounting requirements would apply to utilities predominantly engaged in lo-

cal business subject to State regulation. Thus, Representative Cole, explaining the bill in the House on behalf of the House Committee, said (79 Cong. Rec., Part 9, p. 10384):

> A uniform system of accounting is established, and because of the demand therefor and the admission on the part of most everyone that such is advisable, the provisions therefor will very likely be required of companies now subject to State regulation because of a small fraction of their business being under the Federal Commission. We have thought this advisable because it is most necessary to have uniformity in accounting as well as depreciation instead of 48 different methods. This provision will be followed, in my judgment, by the adoption by the State Commission of such uniform method as the Federal Power Commission will prescribe.

Significantly, Congress rejected efforts to amend the Act to exempt utilities regulated by a state commission, and the legislative debates at that time showed that the proponents of the Act regarded it essential that the Commission possess the power to get accounting information under a unified accounting system, regardless of the fact that a reporting utility might also be subject to state regulation. In light of this background, we do not find that the public interest will be served by exempting FPL from compliance with the Commission's accounting requirements.

The Commission further finds:

(1) Florida Power & Light Company (FPL) is a corporation organized and existing pursuant to the laws of the State of Florida.

(2) FPL owns and operates facilities, among others, for the transmission of electric energy trans-

mitted from points of generation in the States of Georgia and Florida to points of consumption outside the State in which it is generated, which facilities are in addition to, and do not include, facilities used for the generation of electric energy, facilities used in local distribution or only for the transmission of electric energy in interstate commerce, or facilities for the transmission of electric energy consumed wholly by the transmitter.

(3) FPL is, therefore, a public utility within the meaning of that term as used in Section 201 of the Federal Power Act and subject to the jurisdiction of the Commission.

(4) FPL, as a public utility under the Federal Power Act, should be ordered, *inter alia,* to file with the Federal Power Commission original cost statements in the manner provided in Section 120.3 of the Commission's Regulations under the Federal Power Act and Electric Plant Instruction No. 1 of the Commission's Uniform System of Accounts Prescribed for Public Utilities and Licensees Subject to the Provisions of the Federal Power Act.

(5) The exceptions of FPL and of the Florida Commission to the Examiner's initial decision should be denied.

The Commission orders:

(A) Within 60 days after the issuance of this order, FPL shall file with the Federal Power Commission original cost statements in the manner provided in Section 120.3 of the Commission's Regulations under the Federal Power Act and Electric Plant Instruction No. 1 of the Commission's Uniform System of Accounts Prescribed for Public Utilities and Licensees Subject to the Provisions of the Federal Power

Act, and shall comply with all requirements of the Commission's Regulations under such Act.

(B) The decision of the Presiding Examiner, as supplemented above, is adopted as the decision of the Commission.

(C) The exceptions to the Examiner's decision are denied.

Commissioner Carver, *joined* by Commissioner O'Connor, *dissenting.*

CARVER, *Commissioner,* joined by O'CONNOR, *Commissioner, dissenting:*

By eschewing the opportunity to let this case turn on the exercise of a discretion in the Commission not to take jurisdiction, and electing to have it turn on the "commingling" test of jurisdiction, the Commission has made it necessary for me to dissent.

This dissent does not stem from sympathy for the Florida Power & Light Company, whose arguments against being regulated, particularly in the matter of the impact of conformance with the Uniform System of Accounts, affront the legislative purpose. Congress did not saddle consumers with "unnecessary" costs, when it directed the Commission to set up a uniform accounting system.

Nor is my dissent based upon a belief that the Commission has misread or misinterpreted the thrust of certain recent judicial pronouncements on the "commingling" theory. The cases cited are distinguishable on the facts, but the thrust is in the direction the Commission has taken.

The vice I find in the Commission's decision, which prevents me from joining in its statement, is that its adoption of the commingling theory as a test for jurisdiction *per se,* interprets the Federal Power Act,

to have a reach beyond that which I find in the statute.

The Federal Power Act is today found to grant to the Commission jurisdiction over *any* company which generates electric energy in the form of alternating three-phase 60-cycle current, if that company is interconnected and electromagnetically synchronized with any other generating source producing electric energy in the same form in another State.

More than 90% of the Nation's electric generating capacity is interconnected in this fashion. The only major exception is the electric generation of Texas, which is interconnected within Texas but not with out-of-Texas systems. Such a test for jurisdiction writes out of the statute the intrastate and industrial exceptions to coverage under the Act, and in doing so objectionably usurps a prerogative of the Congress.

From its outset, the case was tried on the narrow issue of jurisdiction—a so-called "straight status case." Florida Power & Light Company has an interconnection with Florida Power Corporation, at a point 180 miles from the Georgia state line. The decision turns on the theory that at this interconnection, any "flow" of energy from Florida Power Corporation to Florida Power and Light Company may not be assumed to be Florida generated energy from Florida Power Corporation's generating system, but rather to be interstate in origin by reason of the interconnection by the Florida Power Corporation with out-of-Florida generating sources. The Florida Power Corporation system is said to be "permeated" or commingled with out-of-Florida energy.

The facts of interconnection are uncontroverted. Aided by the engineering testimony of the Staff witnesses Jessel and Jacobsen, the Staff's case for the ultimate jurisdictional fact of electric energy in Flor-

ida Power & Light Company's system being transmitted in interstate commerce is this "permeation" or "commingling." The Examiner neatly summarized:

> The cause and effect relationship in electric energy occurring throughout every generator and point on the Georgia, Corp and Florida systems constitutes interstate transmission of electric energy by, to, and from Florida. It is the electromagnetic unity of response of Florida, Corp, Georgia and other interconnecting systems that constitutes the interstate transmission of electric energy by Florida." (Ex. Dec., *infra*, p. 568.)

In undertaking to temper the impact of the Examinter's forthrightness (a forthrightness conforming to the theory upon which Staff's case was submitted), the Commission turns to Exhibit 18 as supporting a Commission finding (as opposed to an Examiner's finding) that interstate energy reached the system of Florida Power & Light Company. But that exhibit (or any exhibit) shows no more than that "commingled" energy reached the Florida Power & Light Company system. This assumes the fact in issue, and thus begs either the question of jurisdiction or the question of substantiality or both. No staff exhibit purports to depart from the assumptions made to support the "commingling" theory.

The Examiner fairly recognized that "commingling" is only a theory. But he found that the theory of commingling was sound and proved, and that its proof obviated tracing.

If commingling obviates tracing, then the reach of the Commission's jurisdiction is plenary. Furthermore, it has become plenary in 1967, while the act was passed in 1935 and has not been changed by Congress (in respects material here) since.

The Supreme Court in *Connecticut Light and Power Co.* v. *F.P.C.*, 324 U.S. 515, at 515, credited the Congress with determining that

> federal jurisdiction was to follow the flow of electric energy. (at 529)

But is federal jurisdiction to follow the changes in the theories which are devised by company or Commission engineers to describe a still-mysterious phenomenon? For myself, I cannot accept the premise that the "commingling" theory can change the law as radically as to eliminate two explicit exceptions to our jurisdiction.

Turning to the cases cited by the majority, most of these cases involved jurisdiction over wholesale sales, not jurisdiction *per se*. The two "straight status" cases in the Supreme Court reports—*Connecticut Light and Power Company* v. *F.P.C.*, 324 U.S. 515 (1945), and *Jersey Central Power & Light Co.* v. *F.P.C.*, 319 U.S. 61 (1942)—do not support the approach used here, and the Commission's opinion today is directly contrary to the latter's statement (at 319 U.S. 72) that "mere connection determines nothing." Today's decision has connection determining everything.

The cases cited in the Commission's opinion, although sales cases not solely status cases, carry the process of interpreting legislative language *almost* as far as the Commission goes today. The final step may be a short one, but short or not, it is legislative.

The discussion which asserts that the commingling or electromagnetic synchronism test for jurisdiction under Section 201 of the Federal Power Act supports the public interest in the expansion and extension of interconnection arrangements for greater service reliability is not persuasive. I fully agree that interconnections serve the objective of reliability, and that reliability is strongly in the public interest. But with the present near universality of interconnections, it would seem that the Commission's opinion would as

likely lead to present connections being broken as to new connections being established or existing connections strengthened.

Congress may have intended that the provision of Section 201(b) which states that the Commission "shall not have jurisdiction * * * over facilities used * * * only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter" was to have a diminishing effect with the passage of time; but I do not think that Congress can be said to have intended this diminution to proceed to the vanishing point. It reaches that point for all practical purposes when the Commission adopts the commingling test for determining interstate flows after virtually the entire electric generating capacity of the United States is interconnected under electromagnetically synchronous conditions.

My doubts that the statute should be so read are reinforced when the diminished meaning of Section 202 following the application of the commingling test is considered.

The stated purpose of Section 202 was to assure an abundant supply of economical energy by *voluntary* interconnection of facilities. If jurisdiction inexorably follows interconnection, the nonjurisdictional utilities cannot retain any aspect of their independence once they agree to interconnect. Impregnation is indivisible. Such a reading of Section 202 is hardly conformable to its general spirit, and is inconsistent with the legislative history, of this part of the Act.[1]

Another consideration, not related to the scope of the statute, suggests itself. The Commission's adoption

[1] Senate Report No. 621 on S. 2796, 74th Cong., 1st Sess., at p. 49, May 13, 1935; and House Report No. 1318 on S. 2796, 74th Cong., 1st Sess., at p. 27, June 24, 1935.

of the commingling theory conceivably could deny to a small utility remote from its supplier's generation the opportunity to object to wheeling charges on a mileage or rolled-in cost basis, as opposed to cheaper charges based on a displacement theory. The far-reaching commingling theory adopted today could prove embarrassing to the Commission, which presumably would not want to have one rule for establishing jurisdiction, and another for regulating under it.

I do not wish to be misunderstood. From the standpoint of it being the largest electric utility in Florida, on the basis of its being nationally ninth in revenues, fourteenth in plant investment, and sixteenth in energy sales, and from the standpoint of the upward trend in its energy transactions with interconnected companies, Florida Power & Light Company probably ought to be under Federal Power Commission regulation.

But our adjudicative responsibilities do not turn upon what the law ought to be, but upon what it is. Counsel for the company candidly admitted that the law as it is quite possibly would apply to one of his company's wholesale sales. Such a result might be equally offensive to my reading of the statute, but it would have the merit of resting squarely upon decided cases. We elected to plow new ground with a straight jurisdictional approach, and absent square authority, I find the result to constitute too great a stretching of our charter. I would reverse the Examiner, and let a jurisdictional finding wait for a sale case.

FLORIDA POWER & LIGHT COMPANY, DOCKET No. E-7210

ORDER DENYING APPLICATION FOR REHEARING

(Issued May 2, 1967)

On March 20, 1967, 37 FPC 544, the Commission issued Opinion No. 517 and accompanying order in the above-entitled proceeding. Application for rehearing of this Opinion and order has been timely filed under Section 313(a) of the Federal Power Act by the Florida Power & Light Company.

In Opinion No. 517 and order the Commission found that the Florida Power & Light Company (FPL) is a public utility within the meaning of that term as used in Section 201 of the Federal Power Act and subject to the jurisdiction of the Commission because FPL owns and operates facilities, among others, for the transmission of electric energy transmitted from points of generation in the States of Georgia and Florida to points of consumption outside the State in which it is generated. The Commission further found that these facilities are in addition to, and do not include, facilities used by FPL for the generation of electric energy, facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or facilities for the transmission of electric energy consumed wholly by the transmitter. The Commission ordered FPL to file original cost statements in the manner provided in Section 120.3 of the Commission's Regulations under the Federal Power Act and Electric Plant Instruction No. 1 of the Commission's Uniform System of Accounts Prescribed for Public Utilities and Licensees Subject to the Provisions of the Federal Power Act. FPL was

also ordered to comply with all requirements of the Commission's Regulations under such Act.

FPL requests that the Commission grant rehearing and thereafter issue a new order dismissing this proceeding on the merits, asserting that the Commission's findings as above described are without basis in law or in fact. In support of its application for rehearing, FPL lists numerous specific findings which it contends represent error on the part of the Commission.

Upon consideration of FPL's application the Commission finds that the arguments advanced by FPL are essentially the same as those set forth in its brief to the Examiner and in its exceptions to the Examiner's initial decision. These arguments were covered in the Examiner's decision and were rejected in the Commission's Opinion No. 517. No new facts or arguments are presented which would be cause for granting rehearing or disturbing the original Opinion and order.

The Commission finds:

The assignments of error and grounds for rehearing set forth in the above-described application for rehearing present no fact or principles of law which were not considered by the Commission when it issued its Opinion No. 517 and accompanying order on March 20, 1967, and which having now been considered warrant any change in or modification of said Opinion and Order.

The Commission orders:

The application for rehearing filed by the applicant, Florida Power & Light Company, on April 11, 1967, is hereby denied.

Commissioners Carver and O'Connor *dissenting* for the reasons set forth in their dissent to Opinion No. 517 issued March 20, 1967.

APPENDIX D

INITIAL DECISION OF THE PRESIDING EXAMINER IN INVESTIGATION TO DETERMINE JURISDICTION

(Issued July 12, 1966)

I

INTRODUCTION

WENNER, *Presiding Examiner:* Florida Power & Light Company (Florida) engages in the generation, transmission, and distribution at wholesale and retail of electric energy throughout major portions of Florida. The essential issue in this case is whether Florida is a public utility—whether the Commission has jurisdiction over it under Section 201 of the Federal Power Act. This depends on whether Florida operates facilities for the transmission of electric energy in interstate commerce.

If the Commission has jurisdiction over Florida, Florida is required to maintain its accounts according to the Commission's Uniform System of Accounts; therefore, whether Florida should so maintain its accounts is in issue in this proceeding. But there is not in issue in this proceeding any rate matter. However, if Florida is found to be a public utility, the Commission would have jurisdiction in other proceedings with respect to the rates of such of its sales for resale which are in interstate commerce, and also with re-

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spect to compelling its physical interconnection with other systems. But decisions on these matters are not in issue in this proceeding.

II

THE CENTRAL ISSUE: DOES FLORIDA TRANSMIT INTERSTATE ELECTRIC ENERGY?

The first and indeed the major question in this proceeding is: Does Florida transmit interstate electric energy? There are many significant factors which bear on this issue, but these two are major:

(1) Florida is interconnected with Florida Power Corporation (Corp), another Florida electric utility company. Substantial amounts of electric power are interchanged between Florida and Corp.

(2) Corp is interconnected with Georgia Power Company (Georgia), which operates in Georgia. Substantial amounts of power are interchanged between Corp and Georgia.

So the question becomes: Is electric energy transmitted between Georgia and Florida via Corp?

We turn to the details of the problem of interstate transmission, considering first the particular interchanges themselves and the interrelationships among the various participants, because these may cast light on the nature of the interstate transmission, if any, and then the question of interstate transmission itself.

III

THE FLORIDA SYSTEM: INDEPENDENCE AND INTERDEPENDENCE

Florida provides electric service to the east coast of the state, except for the Jacksonville area and that of

five other municipal systems. As of December 1964,[1] it operated ten steam-electric generating plants located in various parts of its system. These are interconnected by a transmission grid of 2,500 miles, of which 1,400 miles operate at high voltage, 115 kv or above. Florida has a net dependable generating capacity of 2.8 million kw.

The generation of electric energy over Florida's system is controlled by a computer in its dispatching office at Miami. Loads on Florida's system constantly change from moment to moment as machines and lights are turned on and off by customers. The computer arranges for load changes to be met by adjusting generation at the various units on Florida's system so that energy to meet the new load is provided in the most economic way. These computer assignments are based on the respective generating unit efficiencies, transmission line losses, and fuel costs at various plants. Under this computer control Florida's system is operated as a unified system, not as a collection of connected plants.

Corp and Tampa Electric Company, both electric companies in the state and which are interconnected with Florida, also operate similar automated systems.

A. Florida's Independence

Florida's generating capacity is installed essentially to serve its own loads. In the main, it has adequate generating capacity to meet its own loads. Its plans are based on its continuing, in the main, to supply its own needs in the future.

B. Florida's Interdependence

Florida has relationships and is interconnected with four other Florida electric systems, Corp, Tampa Elec-

[1] Unless otherwise noted, all figures are approximate and are for the calendar year 1964.

tric Company (Tampa), Orlando Utilities Commission (Orlando), and the City of Jacksonville (Jacksonville).

Florida, Corp and Tampa form the Florida Operating Committee with Jacksonville and Orlando as associate members. The Committee meets several times a year to consider mutual problems relating to the interconnected operation of the systems.

The following amounts of electric energy were exchanged during 1964 between Florida, on the one hand, and the other members of the Florida Operating Committee, on the other.

Transferred from electric utility system	Transferred to electric utility system	Amount transferred (kilowatt-hours)
Florida Power & Light Co	Florida Power Corp	107,642,000
Florida Power Corp	Florida Power & Light Co	61,598,000
Florida Power & Light Co	Tampa Electric Co	43,081,000
Tampa Electric Co	Florida Power & Light Co	59,404,000
Florida Power & Light Co	City of Jacksonville	17,268,000
City of Jacksonville	Florida Power & Light Co	18,181,000
Florida Power & Light Co	Orlando Utilities Commission	21,431,000
Orlando Utilities Commission	Florida Power & Light Co	59,876,000

As indicated on the table above, power between Florida and each of the other members of the Committee was exchanged in both directions. The electric energy so interchanged by Florida totaled three percent of its net generation of 12 billion kwh.

The energy is interchanged on either a scheduled or inadvertent basis. Scheduled transactions take place after discussion between the dispatchers for each system and are based on the needs of one part and the availability of power on the part of the other, on a "when, as and if basis." During the system peak the five members of the Florida Operating Committee exchange information daily on the amount of spinning reserves each expects to carry. The purpose of the energy interchanges is to take care of temporary

needs. There are no economy sales (sales by a company that can produce lower cost power to a higher cost producer) because fuel costs are similar for all members.

There are also inadvertent power flows, the free flow of power that occurs between two interconnected systems when there is a difference between the angle of the voltage or the magnitude of the voltage on one side of the point of interconnection compared to the other. Inadvertent interchange of energy includes intentional interchange energy resulting from the use of frequency bias as well as unscheduled interchange resulting from human or equipment errors.

Interchanges of power are measured, netted, and payment is made for the balance at regular intervals.

In its 1965 Form 12 report Florida lists its reserve capacity at 656,000 kw, 411,000 kw from its own system, and in addition, from the other members of the Florida Operating Committee, "Reserve capacity usually available amounts to 245,000 kw. This is spinning reserve instantly available for emergencies from Florida Power Corporation, Tampa Electric Company, City of Jacksonville and Orlando Utilities Commission." Florida also contributes to the joint reserves of the other members of the Florida Operating Committee.

The arrangements regarding reserves available from the other members of the Florida Operating Committee are not written or firm guarantees. On many occasions the reserve available from each of the members of the Florida Operating Committee has been less than 80% of its allocated share.

The Committee also coordinates the overhaul and maintenance schedules of the five systems so that too many large units are not out of service at a time when they may be needed.

The coordination of reserves, overhaul and maintenance by the Florida Committee is by mutual agreement. The agreements are oral and informal, and are recorded in the minutes of the Committee meetings. There are no sanctions for non-compliance. There is no centralized directorate or administrative nucleus to direct operations. Some other interconnected systems also operate in a similar manner.

C. The Florida, Corp, Georgia Relationship

Corp is interconnected with Florida as well as two other members of the Florida Operating Committee, Tampa and Orlando. Corp is also interconnected with Georgia. Thus Corp is interconnected with Florida on the south and with Georgia on the north.

Georgia is a subsidiary of The Southern Company (Southern), a holding company whose other subsidiaries are Gulf Power Company (Gulf) which operates in northwestern Florida, Alabama Power Company (Alabama), and Mississippi Power Company. Corp is interconnected with Gulf, and Gulf is interconnected with Georgia and Alabama. Pursuant to an agreement between the subsidiaries of Southern, on the one hand, and Corp, on the other, during the summer Corp makes available 100,000 kw to the Southern subsidiaries and during the winter the Southern subsidiaries make available to Corp 100,000 kw. During 1964 Georgia delivered to Corp 97 million kwh and Corp delivered to Georgia 82 million kwh. In addition 3.9 million kwh were wheeled for the Southwestern Power Administration over Southern's lines across the Georgia-Florida state line to Corp. For many days, including peak load periods, there was a flow in both directions during a 24 hour period over the Corp-Georgia interconnection.

Georgia is also interconnected with Duke Power Company, Tennessee Valley Authority, Southeastern Power Administration and others. These systems operate in states beyond Georgia.

D. Florida—A Member of the Interconnected Systems Group

Florida and the other members of the Florida Operating Committee are members of a multi-state electric network, the Southeast Region of the Interconnected Systems Group (ISG) which covers the southeastern and central portions of the country. Florida operates in synchronism with the 140 members of ISG and is ready to assist them or to receive assistance from them in case of emergency. Thus during a 580 mw generator loss by a midwestern utility Florida contributed 8 mw to ISG.

Electric energy transmitted between Corp and Georgia passes through Fort White, a point at the northern part of Corp's system. If power flow exceeds 100 mw at this point the ties open, cutting off the power. Hence assistance between Florida and ISG via the Corp-Georgia interconnection cannot be relied on where the need exceeds 100 mw. However 12 of Florida's 24 generating units generate 75 mw or less. An outage of any of these units would lead to almost instant ISG assistance to Florida. However, no such limitation appears applicable to assistance from ISG via the Florida-Corp-Gulf-Georgia interconnections.

E. Conclusion

Florida is operated, to a large extent, as an independent company. It is also an operation which is interconnected with and interdependent with other Florida electric companies. In turn one of these other

companies, Corp, is interconnected with and interdependent with Georgia which in turn is interconnected with and interdependent with a network of electric systems operating in many states. The situation and relation of Florida to these other systems provides the background for the transmission of energy among them.

IV

THE ELECTROMAGNETIC UNITY OF FLORIDA, CORP, GEORGIA, AND THE TRANSMISSION OF INTERSTATE ELECTRIC ENERGY BY FLORIDA

Under Section 201(c) of the Act electric energy is transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof within the United States. Granted that electric energy is transmitted between Florida and Corp, and between Corp and Georgia, the question is posed: Is electric energy transmitted to Florida from Georgia or to Georgia from Florida? The answer depends on what constitutes interstate transmission of electric energy.

Electric power on Florida, Corp, and Georgia and all other interconnected systems is supplied as alternating current at a frequency of 60 cycles. Interconnected synchronous operation, or "parallel operation," as the term is used in the industry, requires that the frequency of each system be in synchronism with that of all others in the interconnection. Two or more electric systems cannot (except under special and rare conditions) operate together unless they are in synchronism. This means that the current pulses on these systems, and thus the frequency, coincide exactly; not approximately, but exactly. Birmingham is served by Alabama which is interconnected with Georgia which

is interconnected with Corp. Miami is served by Florida which is interconnected with Corp. The frequency of the pulses is exactly the same in Miami and Birmingham, and if it changes to a new value in Birmingham, then it changes to exactly that same value in Miami. The speed of every electric generator on every electric system in an interconnected group is irrevocably locked to the same frequency. A variation in one affects all.

The line bias with frequency control is the technique used to maintain frequency at 60 cycles on interconnected electric systems operating in synchronism, such as Florida, Corp and Georgia, and is also used to match generation with net system load. Bias is the automatic shift of a system's interchange schedule with frequency. The basic function of modern frequency and tie line control is that of regulating total generating output in each individual system or control area in such a way that the total generation will match continuously and as closely as possible the total system load, including scheduled load on interconnection ties.

Frequency never remains at 60 cycles—it is always a bit above or a bit below, because the loads are always fluctuating and the generation follows to keep the system load and generation in balance and as close to 60 cycles as possible. Although deviations in frequency almost always occur due to the impossibility of matching instantaneous load variations with rapid changes in generation, it is important for system operation to keep these frequency deviations as small as possible.

The magnitude of the change in instantaneous generation and frequency on an interconnected system will tend to diminish as the distance from the point of

load change increases. But a load change at any point will have an effect on the instantaneous generation and frequency at every point on the interconnected system. These effects can be calculated.

Each generating unit when operating at a speed corresponding to 60 cycles has mechanical energy of rotation stored in its rotating components which is automatically convertible to electric energy when there is a decrease in frequency and a corresponding drop in revolutions per minute. When a load is added suddenly to an electric system or a generator is taken suddenly out of service, assuming no other changes occur, every generating unit operating on the Florida system and all connected systems almost instantly experience a loss in speed, so that the mechanical energy of rotation of every generator is converted to electric energy. The sum total of the electric energy so obtained through the conversion of mechanical energy of rotation supplies part of the new load or takes the place of some of the lost generation. Thus every connected generator on the entire interconnected system contributes energy to the interconnected system to supply part of the additional load and so maintain the balance between total system generation and total system load. Following this initial reaction, the governor on each generator reacts in accordance with its sensitivity, rate of response, and position in relation to its "dead band" (the area within which a governor will not respond to a change in load), causing additional steam to be applied to the turbines and to speed up the generators thus producing more energy, which in turn increases the speed of all generators, bringing frequency back to normal. As these events occur, the tie line bias of all the systems is operating so that the net interchange of each system with its neighbors will tend to

return to the former prearranged level. Because of the tie line bias of each system, the particular system on which the increase actually occurred will eventually increase generation to supply the additional load and the other systems will correspondingly reduce their temporarily increased electric generation.

Changes in load at various points on all systems are constantly occurring, producing changes in frequency throughout all interconnected systems. The resulting changes in generation of electric energy throughout the interconnected systems reduce the range of the changes in frequency and thus improve the efficiency of operation of the interconnected systems. Thus unnecessary speed-up or slow-down in generating equipment is minimized; clocks keep more perfect time; precision industrial operations are improved; and oscillations between generators are reduced. This is accomplished by the dispersal of the immediate effects of load changes throughout the electromagnetically interlocked generators of the interconnected systems. One of the reasons for the interconnection of systems is the ability of such systems to promote stability in generation and frequency by dispersing the effects of load changes throughout larger systems. These effects result in a constant swapping and redistribution of loads borne by the various generators throughout interconnected systems.

These changes are worked through quickly. But they occur. And they occur continuously and frequently.

Thus the modern electric system, such as that of Florida and the systems with which it is interconnected, is an ever varying one; loads and generation are constantly varying from moment to moment as lights are switched on and off and as workmen increase or decrease the power in the machines they use in myriad operations.

For any particular loading on an electric system or interconnected set of systems all of the electric energy produced by all the generating units is delivered to the common coordinated and integrated modern transmission system from which all of the customers are supplied. Variations in load at any point cause changes throughout the interconnected electric systems because of the interdependence of the generating sources. All generating units connected to a common network experience the same changes in frequency and all clocks connected to such a network experience these changes in frequency and maintain the same time.

No attempt is made to control flows in individual lines because the electric energy flows are determined by the electric characteristics of the network. Only the net of flows over all interconnections on a system is controlled by increasing or decreasing generation so as to maintain interconnection schedules and to maintain frequency as closely as possible at 60 cycles. The changes in generation are in response to changes in load and the effects of tie line bias on all the interconnected systems.

The electrical and other characteristics of an electrical network affect the transfers of electric power and energy at points of connection with other interconnected electric systems. The moment to moment distribution of electric power and energy in an electric network is determined automatically by (1) the electric characteristics, namely, resistance, inductive reactance and capacitative reactance of the electric lines and electric facilities; (2) the locations and power outputs of generating units in operation; and (3) the locations of and amounts of power taken by the electric loads. The electric loads on an electric

system vary from moment to moment and so does the total generation. Consequently, the transfers of electric power at points of connection of Florida with other interconnected electric systems vary from moment to moment.

Electric systems, such as Florida, Corp, Georgia, and others normally have no control over the actual transfers of electric power and energy over any particular transmission interconnection with another electric system if there is more than one interconnection. Similarly electric utilities, such as Florida, Corp, Georgia, and others, normally have no control over the actual transfers of electric power and energy with any particular electric system if there are interconnections with two or more electric systems, which are also directly or indirectly connected. In each instance this is due to the free flow characteristics of the electric networks. All that is normally controlled by each system is the net of flows over all its interconnections which is brought about through the effects of tie line bias, frequency changes, governor reactions and generator responses thereto.

Thus there is a free flow of power and energy throughout the electric network in which Corp and Georgia participate. There is also a free flow of power and energy throughout the electric network formed by Corp and Florida. And there is a free flow of energy among Georgia, Corp, and Florida.

All 140 members of the ISG operate in parallel. All are interlocked electromagnetically and maintain the same frequency. Each member renders automatic assistance to the other in times of emergency. As previously noted, Florida can receive from or contribute to ISG up to 100 mw. The network formed by all the members of ISG and the tie line bias and frequency

control used by member systems provide mutual assistance in maintaining standard 60-cycle frequency, thereby improving the efficiency of operation of all.

Electric systems operating together on an interconnected basis, such as Florida, Corp and Georgia, schedule the amounts of power and energy transactions among themselves on an hour-to-hour basis and each sets on its own net interchange controller the net amount of scheduled transactions. Each system measures the actual transfers at each point of connection with another electric system and the differences between scheduled transactions and actual transfers are balanced out as soon as practical. In order that the technique may work efficiently all interconnected systems must do their share in adhering to schedules as closely as possible.

In actuality there are substantial differences between the scheduled and actual transactions. The reason is that none of the connected electric systems including that of Florida, Corp, and Georgia has any control over the actual transfers of power at each point of interconnection because of the free flow characteristics of electric networks. All that can be controlled on each system having more than one interconnection with other electric systems is the net of transfers into or out of its own system or area. This is particularly so with respect to the electric system of Florida because some of the electric systems to which it is connected have connections among themselves.

An electric utility system such as Florida is essentially an electro-mechanical system to which all operating generators on the interconnected network are interlocked electromagnetically. This means that electric generators, under ordinary operating conditions,

run either at exactly the same speed or at speeds which will result in a frequency of 60 cycles. No operating generator can change its speed by itself as long as it operates connected to the network. All generators connected to the same network must follow each other as to speed and frequency whenever there is a change in frequency, and the frequency of all interlocked generators is always exactly the same.

The electric systems of Florida and all other interconnected systems are essentially alike as to electrical, electromagnetic and electromechanical characteristics. Because they are alike, it is possible to have presently existing interconnected operations on a very large scale, extending from the Rocky Mountains to the Atlantic Ocean and from the Canadian to the Mexican border.

For all practical purposes electric energy in the form of alternating current is generated as needed because it cannot be stored in electrical form. At any point in time such electric energy is delivered where needed on a system at a speed of about 186,000 miles per second. An interconnected electric system such as that of Florida, Corp, Georgia, and the others to which it is interconnected, automatically requires at constant frequency that at every moment total generation always be equal to total load plus losses; otherwise, there is an unbalance causing a change in frequency. An electric system cannot supply one connected load and not supply another connected load. For any particular loading on an electric system, all of the electric energy produced by all of the generating units is delivered to the common transmission network which acts as a single unit from which all of the customers are supplied. For any change in load or generation, there is an electrical effect through a

change in voltage and current at all generators and at all loads.

If a housewife in Atlanta on the Georgia system turns on a light, every generator on Florida's system almost instantly is caused to produce some quantity of additional electric energy which serves to maintain the balance in the interconnected system between generation and load. If sensitive enough instruments were available and were to be placed throughout Florida's system the increase in generation by every generator on Florida could be precisely measured.

Nobody can say for certain just how electricity is really transmitted. The analogy to a flow of water is metaphorical only. Does an electron move from one end of a thousand mile wire to another? Or is there only interaction between neighboring electrons or between fields of force? The answer is not important for legal purposes. The significant factors are that Florida's generators are interlocked electromagnetically with Georgia's and that in consequence, Florida's generators increase their production of electric energy almost instantaneously and automatically in response to increases in load on Georgia's system thereby contributing in some measure to the system supply which meets the increased Georgia load, reducing the variation in frequency on the Georgia system, and increasing its efficiency of operation. Without the Florida response the electric reactions on Georgia and the interconnected systems would be different.

The cause and effect relationship in electric energy occurring throughout every generator and point on the Georgia, Corp and Florida systems constitutes interstate transmission of electric energy by, to, and from Florida. It is the electromagnetic unity of re-

sponse of Florida, Corp, Georgia and other interconnecting systems that constitutes the interstate transmission of electric energy by Florida.

V

QUANTITY IMMATERIAL

It is settled law that the quantity of interstate energy transmitted is immaterial in determining whether there is interstate transmission for jurisdictional purposes, *Hartford Electric Light Company* v. *F.P.C.*, 131 F. 2d 953, 960 (CA2), cert. denied, 319 U.S. 741. *Wisconsin Michigan Power Co.* v. *F.P.C.*, 197 F. 2d 472, 478 (CA7–1952), cert. denied, 345 U.S. 934.

VI

TRACING: ITS LIMITATIONS AND PREFERRED METHOD

In the preceding portion of this decision it has been found that Florida transmits interstate electric energy. The conclusion is based on cause and effect relationships that are interstate in scope. No effort is made to trace the path of the interstate electric energy.

The nature of electric energy is not clearly understood. It is sometimes described as a field of force or as a jostling motion of electrons. Where electric energy from two sources has combined, there is no way to identify a particular portion with a particular source. Electric energy is unlike a liquid, gas or solid, whose path can be traced by methods such as, dyeing one stream of the liquid, chemical analysis, tracing radioactive atoms.

In certain simple situations it can be proved that electric energy, or at least an undivided part of the

whole, comes from a particular source. Thus a load of 100 kw, C, is supplied from a bus [2] which receives 50 kw from each of two sources, A and B. Plainly the load is receiving electric energy from both A and B. The proof here is logical or mathematical. It does not involve knowledge or application of the physics of electric energy. That the energy at C comes from both A and B is both a sufficient and a necessary explanation. However in modern electric systems such as those of Florida, such methods of logical analysis of the raw data are not applicable. There is too much commingling from different sources in the buses, and the systems are so complex that there are many possible sources which could account for the amount of electric energy at any point. In these circumstances, several explanations may be sufficient but none may possess the uniqueness necessary for proof.

The principal parties to this proceeding presented their case by attempting to prove or disprove the interstate transmission of electric energy between Florida and Georgia by tracing the flow of electric energy. The Staff relied on the commingled method, Florida on the systems study method. On the basis of the commingled method, it can be proved that electric energy is transmitted between Florida and Georgia; on the basis of the systems study method the contrary follows.

What both Staff and Florida do by their respective methods is transpose the complex dynamism of modern alternating current electric systems into simplified models on the basis of numerous assumptions. The

[2] The ordinary three phase bus is a set of three bars which conduct electric energy and to which incoming circuits lead and from which outgoing circuits extend. It is used as a junction to which supplies of electric energy are joined or from which electric energy is divided to supply different loads.

crucial difference between the two methods lies in their treatment of a bus and what happens in the bus.

Florida's system studies method treats the bus as having physical dimensions. It replaces each three phase alternating current bus structure by a single conductor bus and uses the point to point tracing principles of direct current circuits with static power sources and with steady state power flows. The method treats the power flow through the bus as constant in value and direction, on the basis that balanced three phase power under steady state conditions is constant in value and direction from instant to instant, and even with some unbalance, the instantaneous three phase power varies only slightly from the average value and does not change direction. Thus in the systems studies method, the flow of electric energy instant by instant in the bus is treated as constant in magnitude and as being in a single direction. This result is achieved by taking the algebraic sum of the magnitudes and directions of each of the three power phases and using the combined value of three phase power as representative of the power flow.

This unidirectional combined value of three phase power is purely a mathematical concept. In reality there is no such thing as three phase power. The physical reality is that there are power flows in two directions in each of the three phases, and that both the direction and magnitude of the power in each phase change from instant to instant. The use of a combined power value moving in a single direction to represent all the power being supplied to the bus conceals the dynamics of the physical phenomena. And it is the physical reality that is of significance for purposes of this case.

Staff's method of treating the bus as a point, a tank or a reservoir, where all the energy supplied

to the bus is commingled, more nearly represents an actual three phase electric power system because it, in effect, allows for the differences, instant to instant, among the electrical characteristics of sources of power supply and loads, and provides for power contributions to electric loads more nearly as they actually take place. It furnishes a more satisfactory explanation for purposes of this proceeding because it is more in consonance with the physics of transmission of alternating current than the combined constant value unidirectional assumption underlying the systems study method.

The systems studies method is used for certain types of engineering studies. For these purposes the use of unidirectional combined values is satisfactory because all that is desired is a mathematical answer regardless whether it is in consonance with the physical dynamics of the situation. The combining of magnitudes and directions is similar to the technique of averaging. Both are meaningful methods of representing certain aspects of data. Thus average per capita income can be a useful concept. But on the basis of average per capita income, there are no poor in the United States. The average is not fully descriptive of the reality, which is a range of incomes from poor to rich. Similarly, the combining of magnitudes and direction of each of the three phases does not provide an adequate description of the dynamic phenomena that occur in a three phase bus which serves as a junction for numerous three phase lines.

If tracing is required then the commingled method with its assumptions reflects the physical reality of alternating current systems better than the systems studies method with its assumptions. On the basis of the commingled method of treating the bus as a point,

a tank or a reservoir, the transmission of electric energy between Georgia and Florida via Corp can be demonstrated.

VII

FLORIDA NOT WITHIN LOCAL DISTRIBUTION EXEMPTION

Interstate transmission of electric energy as used in the Federal Power Act was expected to encompass the almost instantaneous electromagnetic reaction throughout interconnected systems. It was realized that generation at any point on interconnected interstate electric systems would tend to result in an electric response throughout connected facilities even to the final consumer. But Congress did not desire to extend federal regulation to local distribution systems. It therefore included in Section 202(b) an exemption from federal jurisdiction over facilities used in local distribution. But for this exemption FPC's jurisdiction over the interstate transmission or sale of electric enegy would have extended to the local wholesale purchaser and his distributing system. In other words a physical test was first adopted as the standard for interstate electric transmission. But because of the recognition that such a physical standard would by virtue of the technology of electric transmission tend to extend FPC jurisdiction over all interconnected local distribution facilities, Congress found it necessary to limit FPC's jurisdiction by superimposing a legal test: FPC shall not exercise jurisdiction over local distribution facilities.

The reach of interstate transmission is indicated by the Supreme Court in *Connecticut Light & Power Company* v. *F.P.C.*, 324 U.S. 515, at 529–530 (1945):

> * * * This bill [The genesis of Part II of the Federal Power Act] came before Congress

> as prepared by the staff of the Commission, couched largely in the technical language of the electric art. Federal jurisdiction was to follow the flow of electric energy, an engineering and scientific, rather than a legalistic or governmental, test. Technology of the business is such that if any part of a supply of electric energy comes from outside of a state it is, or may be present in every connected distribution facility. Every facility from generator to the appliance for consumption may thus be called one for transmitting such interstate. By this test the cord from a light plug to a toaster on the breakfast table is a facility for transmission of interstate energy if any part of the load is generated without the state. It has never been questioned that technologically generation, transmission, distribution and consumption are so fused and interdependent that the whole enterprise is within the reach of the commerce power of Congress, either on the basis that it is, or that it affects, interstate commerce, if at any point it crosses a state line * * *

Aware of the reach of interstate transmission of electric energy, the Court explained that Congress had imposed an express limitation on FPC's jurisdiction in the form of a separate legal test (324 U.S. at 531):

> * * * To define the scope of state controls, Congress employed terms of limitation perhaps less scientific, less precise, less definite than the terms of the the grant of federal power. The expression "facilities used in local distribution" is one of relative generality. But as used in this Act it is not a meaningless generality in the light of our history and the structure of our government. We hold the phrase to be a limitation on jurisdiction and a legal standard that must be given effect in this case in addition to the technological transmission test * * *

What is the scope of the local distribution exemption? Local distribution begins where high voltage bulk power is reduced to low voltage for the wholesaler who distributes to the local consumer. Thus the Supreme Court stated in *United States* v. *Public Utilities Commission of California*, 345 U.S. 295 at 316:

> * * * The sales were made in California but the facilities supplied "local distribution" only after the current was subdivided for individual consumers. * * *

The same application of the local distribution test was made in *Wisconsin Power Co.* v. *F.P.C.*, 197 F. 2d 472 (CA7–1952), cert. denied, 345 U.S. 934, where the Court stated (197 F. 2d at 477):

> * * * The question is essentially, when does interstate commerce transportation end and where do the local distribution facilities first become operative. We have seen that the power is transmitted from state to state. In the Wisconsin operation, it comes to Stiles in that state by means of the main transmission line from Michigan and there a transformer reduces it in voltage. It then proceeds in transmission over the lower voltage line to still other points where again the voltage is reduced; eventually it comes to the plants of the wholesalers. Thus the interstate transmissions of electric energy continues from Michigan through the transformers in reduced voltage to the wholesaler; upon delivery to him local distribution begins when he resells. His sales and distribution at retail are clearly local in character, and constitute only local distribution; but at no point before delivery to him has been completed, has interstate transmission terminated. In other words "facilities used in local distribution" means facilities used for making resale and distribution to consumers, jurisdiction over which

> is left to the states * * * We think there is no ground for the position that local distribution includes any transmission occurring before the wholesaler who resells at retail is reached * * *

Florida has a transmission grid of 2,500 miles, of which 1,400 are high voltage, 115 kv or above. There are 1,100 miles of transmission facilities used for local distribution. The 1,400 miles of high voltage lines are anterior to distribution to local consumers and are not "facilities used in local distribution."

In *Connecticut Light & Power Co., supra*, the facility of Connecticut Light on which jurisdiction was claimed to rest was a step-down transformer at the Company's substation at Bristol, an isolated segment of its system. The distribution facilities from the Bristol substation to individual consumers were concededly within the local distribution exemption. A connecting system which received some interstate power had an extension which supplied the power to the Bristol substation which reduced the voltage prior to distribution to the consumers. The step-down transformer in the substation was the only facility of Connecticut Light that did not plainly fall within the local distribution exemption. The Supreme Court remanded the case to the Commission to determine whether the transformer performed the last stage in interstate transmission or the first stage in local distribution. In the instant case there is no such problem. Florida's 1,400 miles of high voltage transmission lines are used to transport bulk power and are not part of the facilities used to distribute the power to local consumers. Florida therefore has facilities which are not within the local distribution exemption, and which transmit interstate electric energy.

VIII

EXERCISE OF JURISDICTION

As a public utility under the Act, Florida would be required to keep its accounts in accordance with the Commission's Uniform System of Accounts for Public Utilities. Florida presently files the Commission's principal reports, FPC Form No. 1, Annual Report, and No. 12, Power System Statement. It maintains its books of account in accordance with the NARUC (National Association of Railroad and Utilities Commissioners) system of accounts which are similar to those of the Commission's Uniform System of Accounts. Florida reclassified its plant accounts for the Securities and Exchange Commission in 1942 on an original cost basis. It has been keeping its accounts on that basis at least since 1951. So conforming to the Commission's accounting requirements would not be burdensome.

A second factor is the Commission's jurisdiction over the interconnections of public utilities. A facet of this problem is illustrated by the situation regarding the Intervenor City of Clewiston.

Clewiston is three miles from Florida's Ranch-Fort Myers transmission line. Clewiston owns and operates its own distribution plant. It presently purchases its electric supply from U.S. Sugar Corporation, which in turn purchases Clewiston's requirements from Glades Electric Cooperative, Inc. Glades purchases its power from Florida three miles from Clewiston. Clewiston seeks to purchase directly from Florida. Direct service to Clewiston by Florida would save the City $100,000 per year.

In 1952 Clewiston and U.S. Sugar sought jointly to obtain power for the summer months. Florida stated its willingness to sell power to U.S. Sugar, but was

not willing to permit the power to be resold to Clewiston.

In 1954 Clewiston requested direct service from Florida at wholesale. This was refused on the grounds that this was contrary to company policy, that it would not sell to a municipal at wholesale except in the case of furnishing an emergency supply. As an alternative, Florida proposed to lease Clewiston's distribution system and sell directly at retail within the City. This counterproposal was rejected by the City Commission.

In 1957 Clewiston again requested that Florida sell directly to it. Florida stated in essence that Clewiston's request was rejected, but that it would be willing to buy out the system and sell at retail within the City. The City turned down this counter-offer, and, as a result, was unable to purchase power from Florida. At this conference, Florida restated the same company policy as was stated in the 1954 negotiations.

In 1962 Clewiston again requested a direct power supply from Florida. Florida stated, in essence, that its policy had not changed and it would therefore not sell to Clewiston at wholesale.

In July 1965 Clewiston requested a direct wholesale supply from Florida at the same rates as Florida was using for its sales to Glades, the rural electric cooperative which was reselling Florida power to U.S. Sugar which in turn was selling to Clewiston. Florida stated in essence that the company policy had not changed, and that it would not sell to Clewiston.

In a September 1965 conference Florida's president stated in essence that the company policy regarding selling power to municipalities had not changed, but could change. He would propose to Florida's Board of Directors that if the City of Clewiston would agree to have a referendum to see if the City would sell its

distribution system to Florida or should continue to operate it, and the City Commission would be bound by this referendum, Florida would sell directly to the City if the referendum vote were in favor of City ownership. Florida also stated, in essence, that the rates would not necessarily be as low as the rates to Glades, and that this would have to be worked out. Clewiston informed Florida that if Florida would submit a written proposal it would be presented to the City Commission for appropriate action.

If Florida be held to be a public utility, the Commission has power under Section 202(b) of the Act to direct that it interconnect with Clewiston if, after hearing, it finds this to be in the public interest and not an undue burden upon Florida. Clewiston in Docket No. E-7243 filed an application for such action; however on July 6, 1966, 36 FPC 17, the Commission granted a motion by Clewiston to dismiss this proceeding on the grounds that pursuant to an agreement among Glades, Clewiston and U.S. Sugar, Glades will sell directly to Clewiston at rates representing a reduction of $140,000 from the rates Clewiston formerly paid to U.S. Sugar. This result apparently satisfies Clewiston's immediate objectives. But it does not dismiss the matters and principles raised by Clewiston in the instant proceeding. A finding of jurisdiction herein would enable the Commission to take action with respect to similar problems if they should arise and if such a step should be found appropriate.

Another aspect of the interconnection problem concerns Florida's participation in ISG and its interconnection with 140 electric utility systems throughout the southern and central United States. All these systems operate in parallel and are interlocked electro-

magnetically. All are interdependent to some extent. The Northeast Power Failure of 1965 suggests the reach of such interdependence. It is expedient that FPC's exercise of jurisdiction which it is otherwise found to possess under the Act be in consonance with the reach and realities of modern interconnected electric systems.

IX

CONCLUSION

It is further found and concluded:

(1) Florida Power & Light Company, a corporation organized and existing pursuant to the laws of the State of Florida, owns and operates facilities, among others, for the transmission of electric energy transmitted from points of generation in the States of Georgia and Florida to points of consumption outside the State in which it is generated, which facilities are in addition to, and do not include, facilities used for the generation of electric energy, facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or facilities for the transmission of electric energy consumed wholly by the transmitter.

Florida Power & Light Company is, therefore, a public utility within the meaning of that term as used in Section 201 of the Federal Power Act and subject to the jurisdiction of the Commission.

(2) Florida Power & Light Company, as a public utility under the Federal Power Act, is obligated, *inter alia,* to file with the Federal Power Commission original cost statements in the manner provided in Section 120.3 of the Commission's Regulations under the Federal Power Act and Electric Plant Instruction No. 1 of the Commission's Uniform System

of Accounts Prescribed for Public Utilities and Licensees Subject to the Provisions of the Federal Power Act.

ORDER

WHEREFORE, *It is ordered* that within ninety days from the date of this decision, Florida Power & Light Company comply with all requirements of the Commission's Regulations under the Federal Power Act, including the Uniform System of Accounts Prescribed for Public Utilities and Licensees Subject to the Provisions of the Federal Power Act.

SEYMOUR WENNER,
Presiding Examiner.

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